JUNE, 1954

Vol. 43, No. 6

Industrial Arts and Vocational Education

1914 40th Anniversary Year 1954

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

Photo: Bell Telephone Laboratories

FROM LITTLE THINGS

TREMENDOUS CONSEQUENCES

The transistor is a tiny bit of metal the size of a match-head. It has hairlike wires raying out from it. Not only small in size, it is trivial in appearance. Yet from its creation, its existence, its implications arises the prospect of tremendous advances in radio and television design, in the electronic "thinking machines" that now perform in minutes or hours calculations so complex as to require months and years of unremitting human effort.

From small things, tremendous consequences flow. Happenings in childhood, boyhood, too small to be noticed by uncomprehending adults may bend, warp, distort the youngster's life into despair . . . or again, may open a window to a vista of sunlight illuminating the clear path to success, to mental and spiritual development, to useful and rich careers. Conscientious educators know the importance of the seemingly trivial and wise instructors in mechanical drafting never make the mistake of belittling anything connected with their work. This is a subject that lies upon the broad avenue leading directly to engineering and science. Then why, they say, divert the youngster's attention, cool his enthusiasm, sap his sincerity by saying it does not matter what drawing instruments he uses? Why say that a few pennies pinched in their purchase can ever compensate for the opportunity lost to inspire the boy by the fine and inspiring quality and craftsmanship of a good set? The selection of drawing instruments may be but a moment in a long life, but the consequences can flow far into the future.

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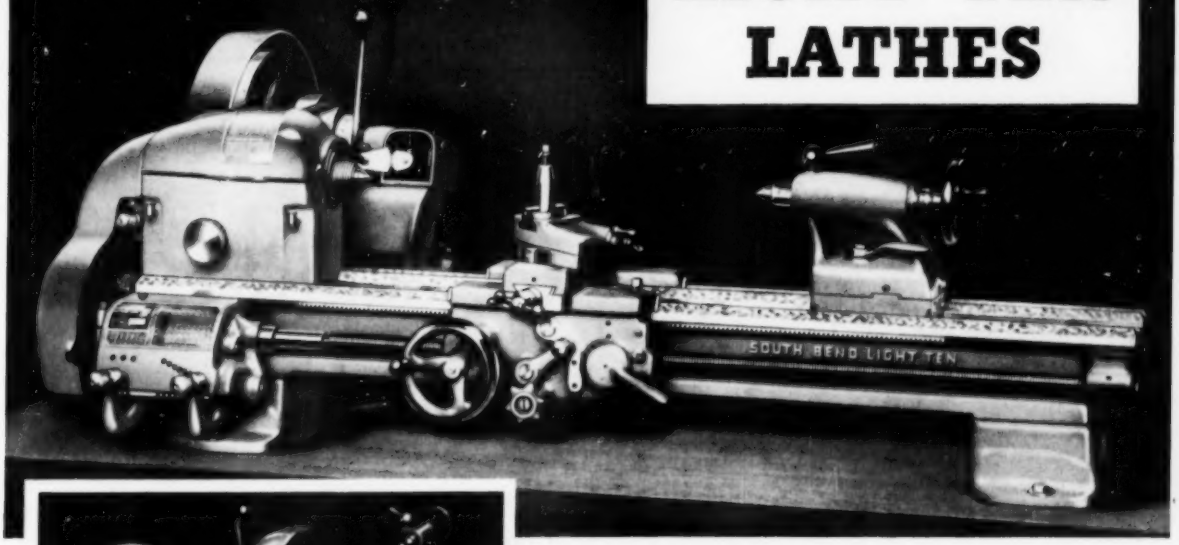

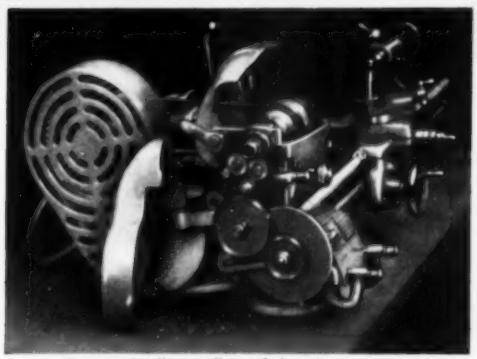

Gears and pulleys well guarded, easily accessible

Light Ten South Bend Bench Lathe, less electrical equipment f.o.b. factory **$522**

The new Light Ten Lathes are particularly suited for school shops. Dollar-for-dollar they are exceptional values. You get all the essential big-lathe features . . . full-range gear box, power feed apron, headstock with precision-bored bearings and super-finished spindle, 12-speed drive, rugged construction, skilled workmanship and dependable accuracy. Students learn quicker on South Bend Lathes for they are easy to operate and almost boy proof—power feeds cannot be locked and substantial guards enclose all gears and pulleys.

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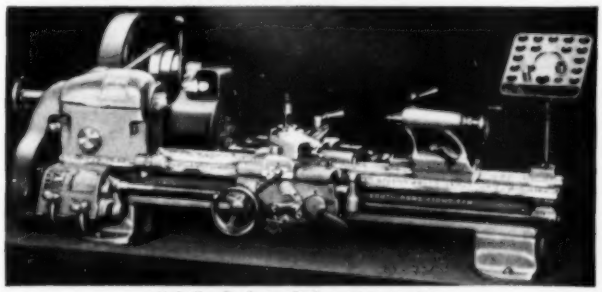

Light Ten Toolroom Lathe — 10" x 3-1/2'

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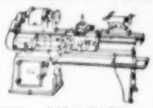
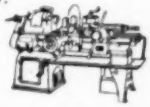

☐ 10" to 16-24" FLOOR LATHES

☐ DRILL PRESSES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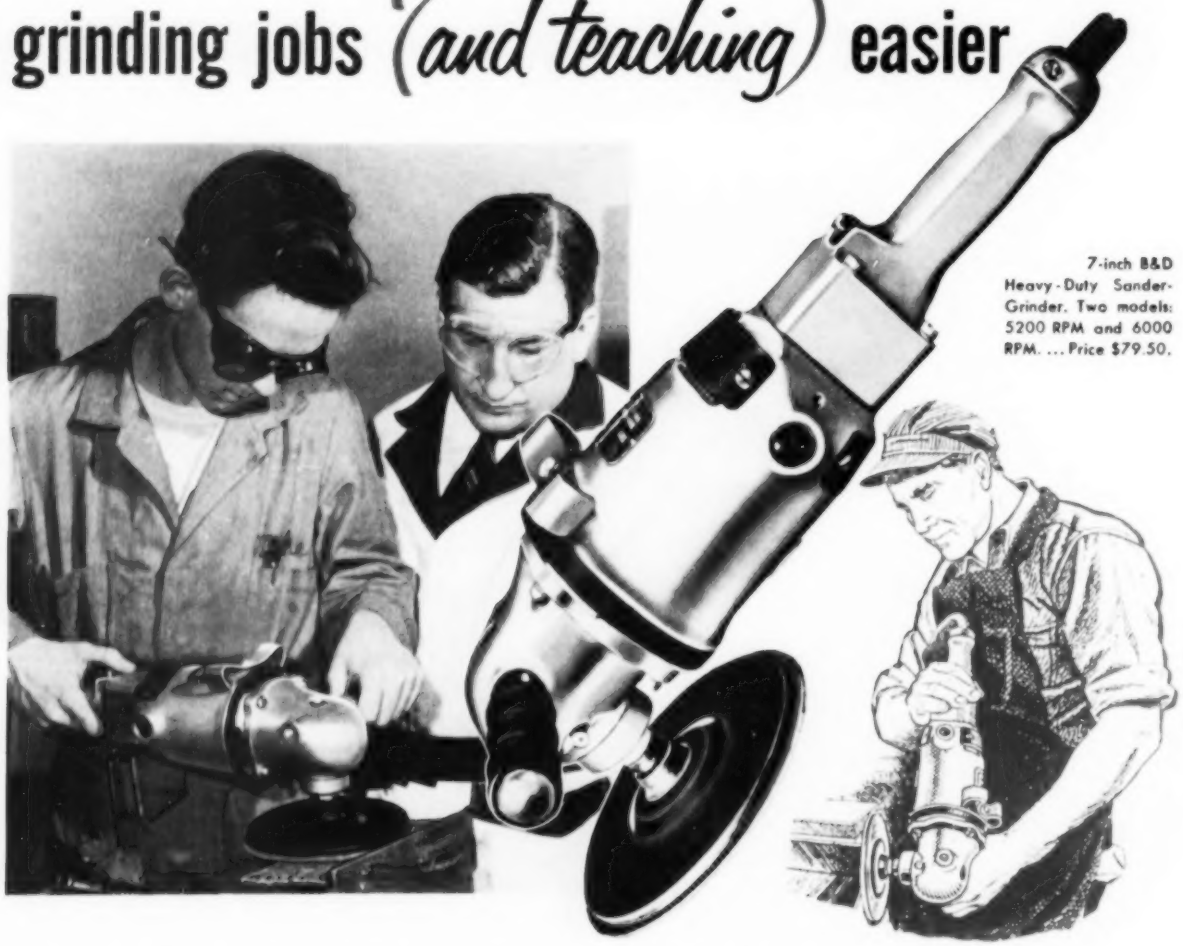

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THE new 7-inch Black & Decker Sander-Grinder has just that power . . . *90% more than ever before.* And note all these other unique features . . . features that mean so much in industry and auto repair shops. This new sander-grinder is lighter (only 14 pounds). Has super power and perfect balance. Die-cast aluminum housing sealed from abrasive dust. Lubricant-sealed ball bearings. Replaceable steel wear ring. Removable inspection plate facilitates service. Shielded air inlet. Large, comfortable rear handle. Knob fitted to hand. Switch protected. Safeguards to prevent accidental operation . . . overcome beginner nervousness. Right- or left-side handle installation. Stand to support tool. Provision for suspending tool.

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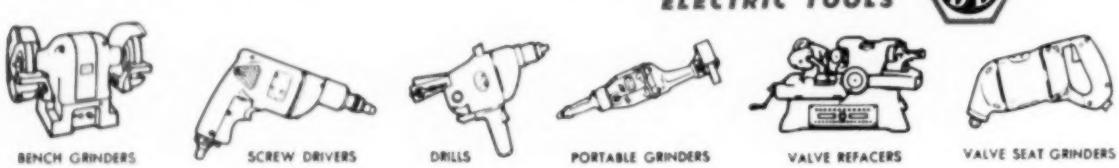

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JUNE
1954

VOL. 43 No. 6

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING COMPANY, 400 North Broadway, Milwaukee 1, Wisconsin • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Illinois • EASTERN OFFICE: 225 Broadway, New York 7, New York.

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This Month's Cover

The cover picture for the June, 1954, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION shows a class in Visual Aids in Industrial Arts at Ball State Teachers College, Muncie, Ind., under the instruction of Dr. Fred J. Schmidt. The students are seen examining some of the projects developed by the class.

Photograph by Bruce Leeka, student under the supervision of Bernard R. Josif, assistant professor in Industrial Arts Photography class. Submitted by Mr. Josif.

Your Next Year's Address

To make sure that you will receive your September issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, send us your new address, including the zone number, together with your former address. Please let us have this information no later than August 15.

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Entered January 2, 1914, as Second-Class Mail Matter at Milwaukee, Wis., under Act of March 3, 1879. Copyright, 1954, by the Bruce Publishing Co. Title registered as Trade Mark in U. S. Patent Office, November 25, 1930. Published monthly except during July and August.

Subscription Information. — Subscription price in the United States, U.S. possessions, and Canada, $3.00 a year, payable in advance. In all foreign countries, $3.75. Copies not more than three months old, 35 cents; more than three months old, 50 cents.

Discontinuance. — Notice of discontinuance of subscription must reach the Publication Office in Milwaukee, at least fifteen days before date of expiration. Notices of changes of address should invariably include the old as well as the new address. Complaints of nonreceipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

Editorial Contributions. — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for upon publication. In all cases manuscripts should be accompanied by full return postage.

Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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ASSOCIATION NEWS

COMING CONVENTIONS

June 7–8. Utah Vocational Association, at Utah State Agricultural College, Logan, Utah. Secretary, William E. McKell, 1005 E. 3rd St., Provo, Utah.

June 8–10. National Council of Technical Schools, at Conrad Hilton Hotel, Chicago, Ill. Secretary, Dr. J. B. Hershman, Valparaiso Technical Institute, Valparaiso, Ind.

June 10–11. Georgia Vocational Association, at Biltmore Hotel, Atlanta, Ga. Secretary, Miss Nancy White, Macon Vocational School, Macon, Ga.

June 15–18. Ohio Vocational Agriculture Association, at Ohio State University, Columbus, Ohio. Secretary, Jack Nowels, R.D. #1, Loudonville, Ohio.

June 15–18. Pennsylvania Vocational Association, at Eagles Mere, Pa. Secretary, Dr. Richard Hartmann, 3810 Walnut St., Philadelphia, Pa.

June 21–25. Colorado Vocational Association, at Colorado A. & M. College, Fort Collins, Colo. Secretary, Wm. E. Ratekin, 310 National Bank Bldg., Grand Junction, Colo.

July 4–8. International Graphic Arts Education Association, at University of Colorado, Boulder, Colo. Secretary, Otis H. Chidester, Tucson Sr. High School, Tucson, Ariz.

♦ The Central Minnesota Industrial Arts Association held its spring meeting at State Teachers College, St. Cloud, Minn., on May 1, 1954. This association is a professional organization of all industrial-arts teachers in Central Minnesota. They have four meetings a year which include demonstrations, lectures, discussions, trips through industries, and the exchange of teaching ideas.

This year the spring meeting again staged an exposition. Students, parents, administrators, industrial-arts teachers, and the public were in attendance. There was a display of student projects from the schools of this area, for which the winners received awards. There were industrial displays at this all-day affair. — *Roger J. Bohm, publicity.*

♦ The 1954, Four-States Regional Industrial Arts and Vocational Education Conference will be held at the Kansas State Teachers College, Pittsburg, Kans., Friday and Saturday, October 1 and 2. Preparations are under way for an exceptionally strong program this year. All interested individuals are invited to attend. — *J. V. Melton, Secretary.*

THE 1954 M.I.E.S. CONVENTION

"Industrial Education in the Years Ahead" was the theme for the twenty-sixth annual convention of the Michigan Industrial Education Society, held in Grand Rapids, Mich., on April 8, 9, and 10. The convention headquarters were located in the Pantlind Hotel.

The first general session was held Thursday evening, April 8, 1954 at 8:00 p.m.

Harold J. Van Westrienen, state director of vocational education, was the chairman. The topic discussed was "Activities of Youth Clubs in Areas of Vocational and Practical Arts Education." The speakers were: Richard Arnold, state president, Future Farmers of America, Plainwell; Joyce Richardson, state president, Future Homemakers of America, Chesaning; and Dale Rhoades, state president, Retail and Office Clubs of Michigan, Flint.

David Boyne, national president, Future Farmers of America, Marlette, gave an excellent illustrated talk on England.

On Friday at 8:30 a.m., a convention breakfast was held at which Morley Dixon, Bay City, vice-president, Michigan Industrial Education Society, acted as chairman.

The speaker was Paul W. Briggs, superintendent, Bay City public schools. He spoke on the topic "A Superintendent Looks at Industrial Education."

The annual business meeting was held Friday at 10:00 a.m., under the chairmanship of Walter Scharmack, president, Michigan Industrial Education Society.

The candidates announced for the vice-presidency were Harold C. Hill and Maurice Overholt.

The 1955 meeting will again be held at Grand Rapids, and the 1956 meeting at Detroit.

Following the business meeting, Dr. J. Fuzak, co-ordinator of industrial arts, Michigan State College, took the chair.

Dr. H. H. London, professor of industrial education, University of Missouri, then spoke on "Industrial Education — Past, Present, and Future."

At the general session, Friday afternoon, Earl L. Bedell, divisional director, vocational education, Detroit Public Schools, was the chairman. The topic was "Problems for Decision in the Administration and Supervision of Industrial Education." The discussion was by W. E. Baker, superintendent of schools, Mesick; H. W. Holmes, superintendent of schools, Marshall; H. Carl Spitler, superintendent of schools, Petoskey; and Ralph E. Brant, superintendent of schools, Ecorse.

The annual convention banquet was held at 6:30 p.m., Friday evening.

Walter Scharmack acted as chairman.

(Continued on page 6A)

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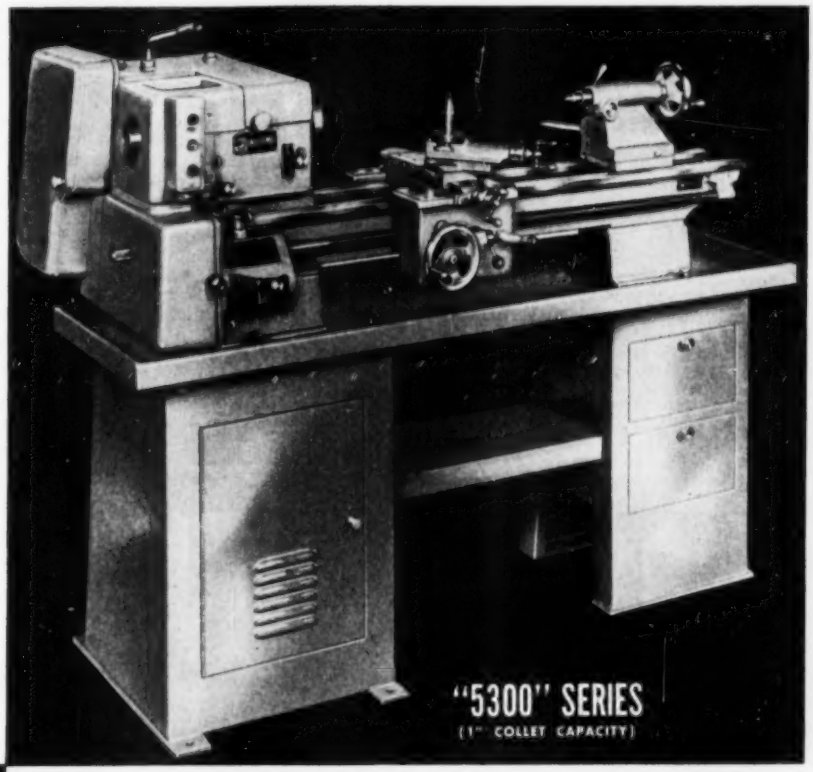

"ZERO-PRECISION" BEARINGS
Precision ground, forged steel spindle turns on widely spaced heavy-duty Timken "Zero-Precision" tapered roller bearings — bearing run-out tolerance is .00015.

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Provides instant selection of 48 threads or feeds. ½" wide steel gears. Ground shafts turn on ball bearings. Plunger-type selector control.

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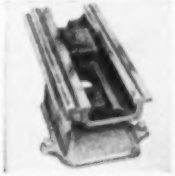

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Massive, semi-steel bed is 7⅜" wide, 5⅛" deep — thickly ribbed and braced. Vee-ways, flat ways and undersides are ground. Built-in screw-type leveling jacks.

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The new CLAUSING "5300" is the most practical 1" collet capacity lathe for vocational training . . . at or near its price. It has *Safety Plus!* Belts, pulleys, shafts and gears are fully guarded . . . headstock hood will not open unless clutch is disengaged, and clutch will not engage unless the hood is closed . . . and conveniently located controls. *It has Efficiency Plus!* It's a husky lathe, ruggedly built to handle every job faster, more accurately . . . has bigger spindle and tailstock ram for wider work range . . . big graduated dials and big controls for faster setups. And it has *Economy Plus!* It's low in cost, both initial and operating . . . and it's low in maintenance cost . . . a heavy-duty precision lathe built to withstand years of round-the-clock production use. Its simplicity of operation saves time for teachers and students alike. The new CLAUSING "5300" is by far —

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ASSOCIATION NEWS

(Continued from page 4A)

Roy Fetherston, superintendent of schools, East Grand Rapids, was toastmaster.

An honorary life membership was presented by Richard Fell, executive secretary-treasurer, Berkley, to Elizabeth F. King, Dearborn, Mich., and one presented by Reinhart Krause, exhibits manager, Bay City, to John J. Metz, editor of the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine.

Howard Gerrish, Ann Arbor, then presented the Master Teacher Award to Joel W. Lee, Owosso, Mich.

Thomas R. Reid, director, Office of Civic Affairs, Ford Motor Company, and assistant director of Defense Mobilization for Manpower in the Executive Office of the President, spoke on "Manpower Management."

At the Epsilon Pi Tau Breakfast, Saturday morning, Gil Hutchings, Grand Rapids, acted as chairman.

The speaker on this occasion was G. L. Sittser, assistant to the president, National Brass Company, Grand Rapids.

Round-table discussions on the graphic arts, machine shop, drafting, driver education, and auto mechanics were held on Saturday morning.

The convention luncheon and Ship's program gave the finishing touch to the 1954 M.I.E.S. convention. About 45 exhibitors had availed themselves of the opportunity to show their wares, and the membership registration ran close to 900.

The Certified Project Booth was visited continually and the M.I.E.S. can feel proud of the convention that has just been concluded.

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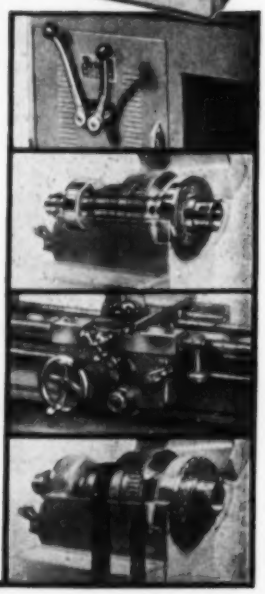

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A DOUBLE CELEBRATION

Alpha Chapter of Epsilon Pi Tau sponsored an all day program Saturday, March 13, 1954, on the 25th anniversary date of the founding of the EPT Fraternity. The dual celebration was also in recognition of the 60th anniversary of the introduction of manual training at the Ohio State University under the sponsorship of Rutherford B. Hayes.

The morning program included a visit to the laboratories. At the afternoon forum program Dr. John R. Ludington of the U. S. Office of Education conducted a leadership forum concerning "Problems That Lie Ahead." He was assisted by Past President J. Homer Winkler, of the International Association of Printing House Craftsmen, President James S. Kirkpatrick of the Magnesium Association of America, and President Gerald Baysinger of the American Council on Industrial Arts Teacher Education.

The initiation was followed by the anniversary banquet attended by 85 people. Dr. Ludington presided at the banquet. Dr. Henry R. Herrman of Wayne University, the principal speaker, presented the topic "A Humanistic Education for Industrial Man."—*Donald G. Lux.*

OHIO INDUSTRIAL ARTS ASSOCIATION CONVENTION

The Ohio Industrial Arts Association Convention was held at Columbus, Ohio, March 25, 26, and 27.

Close to forty exhibitors took advantage of the opportunities offered by this convention to show their wares to the members of this association.

On Thursday morning the first session was started out by discussing problems selected by teacher trainers and supervisors.

R. O. Knight, director of industrial education, Columbus, Ohio, was the discussion leader.

The supervisors on the panel were: E. J. Robinson of the Dayton public schools, and Merle E. Leggett, supervisor of industrial arts of Medina County.

Teacher trainers who took part were: E. W. Tischendorf, professor of industrial arts at Kent State University, Kent, Ohio; and Menzo Stark, professor of industrial arts, Wilmington College.

Teachers were: Stanley E. Spring, Circleville High School; and Robert Wright, Possum Junior High School.

For the afternoon session, publicizing industrial arts in your locality was chosen as the topic.

Dean Kittle, industrial-arts instructor at the high school, Bluffton, Ohio; and Glenn Harrod, Columbus, Ohio, were the speakers.

At the evening session Charles A. Echert, director of industrial arts at Newark, Ohio, was the chairman.

Frank Moore, director of industrial arts, Cleveland, Ohio, spoke on the subject, "Your Relations."

The Friday morning session was under the chairmanship of David Wherry, industrial-arts instructor, Winton Place School, Cincinnati, Ohio.

The theme of discussion was "Problems Common to All Industrial Arts Teachers."

The speakers were: Dr. J. Levon Hill, Bowling Green State University; Jack Schuster, Pure Oil Company, Columbus, Ohio; and C. R. Thomson, Waite High School, Toledo, Ohio.

At the afternoon session, P. S. Waldeck, supervisor of industrial arts, was chairman of a panel of six discussing "Interesting Industrial Arts Programs."

The annual business meeting was held at 4:00 p.m., Friday. This was followed by the annual banquet at 6:30 p.m. William R. Mason was chairman at the banquet and Dr. Clyde Hissong, state director of education, Columbus, Ohio, gave the main address.

On Saturday morning, demonstrations in metal spinning, enameling of metal, ceramics, graphic arts, bench metal, air brush, upholstering, and embossing, were given.

(Continued on page 16A)

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The mechanical training student forms preferences after he has tried various tool designs and brands. It is this knowledge and ability to choose and use the right tool for the job that impresses a foreman or superintendent and improves a young graduate's chances for advancement in the field of industry.

Files are tools which give a student this experience. Let him get to know the "feel, bite and balance" of Nicholson or Black Diamond files. Help him to understand text-wise as well. Nicholson's famous 48-page illustrated book is an excellent aid.* It will give him the confidence to "know what he is talking about" when he goes job-seeking in industry.

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. . . a 15-inch precision lathe especially designed for the spinning of standard gauge metals featuring . . .

5 important, exclusive advantages:

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#0 Ball-Bearing Center
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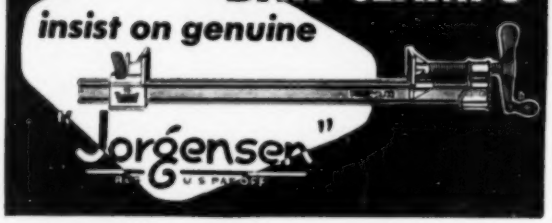

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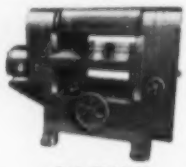
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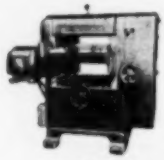
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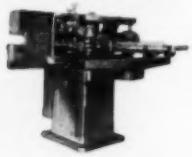
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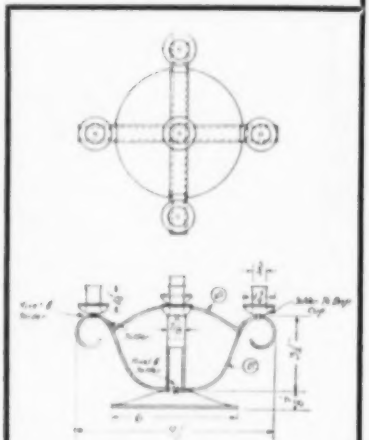
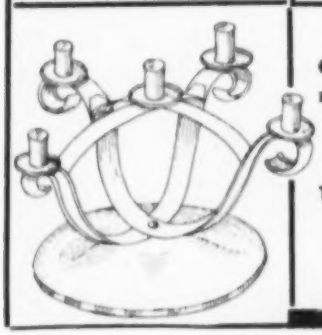


One of the working drawings and the finished sketch (greatly reduced in size) of the five-candle candelabrum typical of the many illustrations.



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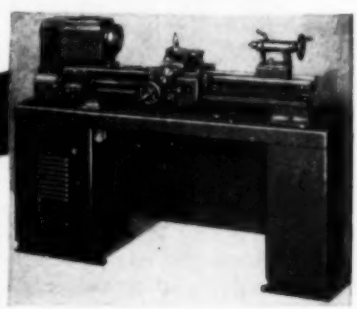

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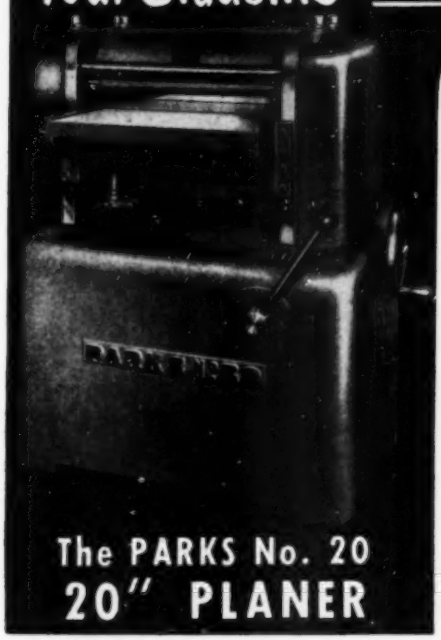

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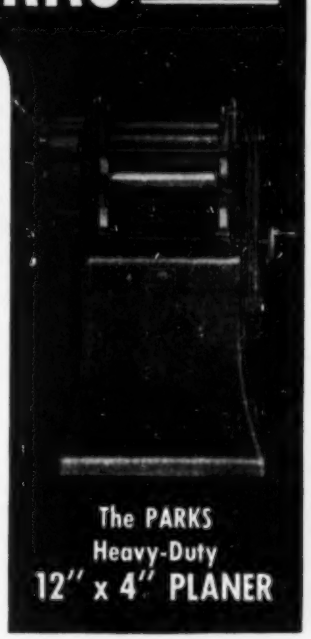

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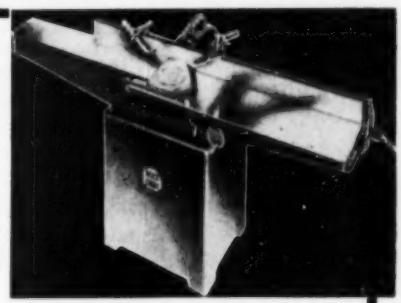

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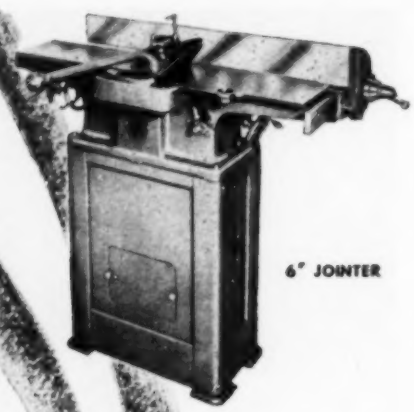

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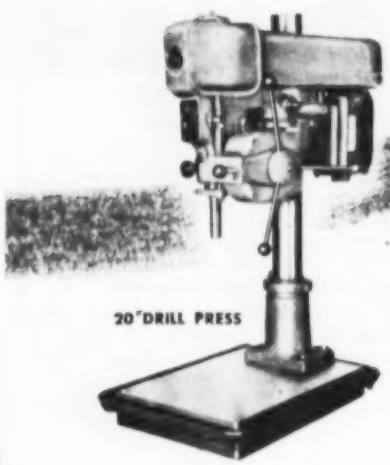

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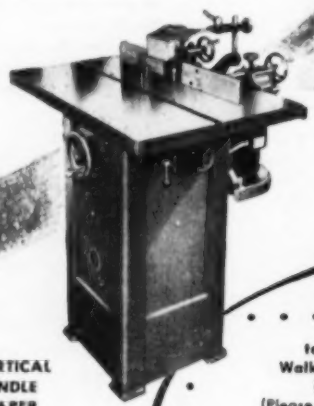

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INDUSTRIAL ARTS and VOCATIONAL EDUCATION
The Shop Teachers' Professional Magazine

JUNE 1954

Instructional Timesavers

HOMER C. ROSE
Falls Church, Va.

What does it cost to run a class? The answer to that question depends on the number of students, the cost of supplies and equipment, the building, instructor's pay, the cost of administration, and many other things. Suppose we guess that a specific class costs $15 per hour (even without taking into consideration many of the administration costs), and the instructor takes five minutes every day to call the roll — what has this cost over the past year? The purpose of this article is to highlight some of the things that may help to save time. Let's take up these timesavers one by one.

The Shop or Classroom

Time will be lost if the room is too hot, too cold, or too stuffy when the students report for class. Because it takes a little time to change the temperature of a room and to let in some fresh air, it may be desirable to open doors and windows for a few minutes before the class arrives. Instructors exchanging rooms should work out a co-operative system for leaving the room in the best possible condition for the next class.

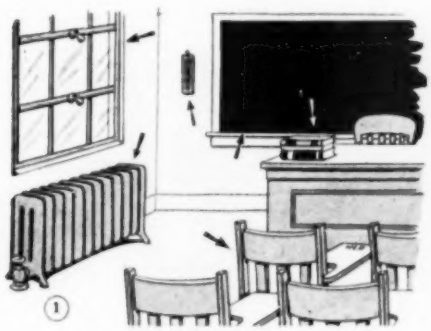

Fig. 1. Get the room ready before class

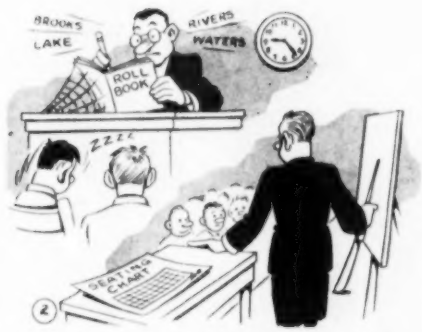

Fig. 2. A seating chart makes calling the roll unnecessary

Prearranging chairs in accordance with the type of instruction planned for a given period may be an instructional timesaver. If a film is to be shown, a different arrangement of chairs will be required from that used for a demonstration around a piece of machinery. Arranging chairs and other equipment should of course be done before the trainees sit down and preferably before they arrive. Early arrivals can help arrange the room.

Chairs and desks should be clean. No one likes to sit down in a dusty chair or to handle grimy material. Instructional time can be lost by students cleaning up chairs and equipment before they settle down for instruction. Unused equipment, publications, and materials of all kinds should be arranged as neatly as possible or removed from the room when they have served their purpose.

Roll Call

Many teachers waste time by calling the name of each student and meticulously recording the information in the class record. There are several ways to save this time. First, if a seating chart is made out and students sit in a certain seat each day, the checking of the roll can be done by the instructor almost at a glance. In some situations it may be preferable to pass around a sheet on which each individual either signs his name or puts his initials after his name on a typed sheet. While some distraction may occur from passing a sheet around during instruction this should not be very significant once the routine is established. The presence of individuals can be verified by calling on them by name from the signed or initialed roll. Probably the one excuse for calling the name of each student as a part of taking the roll is to learn the names. But this is something the alert instructor can do in other ways, and it should not be necessary to waste the time of a class by calling the name of each trainee every period.

Fig. 3. Handing out tools

Fig. 4. A tool panel on each machine can cut down traffic and help to keep tools in good condition

Tools

Some instructors are more interested in tools than in people. This doesn't mean that one should be careless about tools but it does mean that in the learning situation the tools must be available to the students when they need them. To line up a class of 20 students and make them pass by a toolroom window and check out tools for 10 minutes of the hour cannot possibly be justified on a dollars and cents basis. Common tools used frequently by the students should be available on benches or on open panels. A few tools may be kept in locked cabinets or under more careful stowage arrangements — but the old-fashioned toolroom has little place in the school shop program. As a matter of fact, more tools may be lost through stowing them in a toolroom than having them on panels where they can be checked at a glance whenever necessary. It only takes one carelesss man in the toolroom to foul it up to the point where a complete inventory must be made.

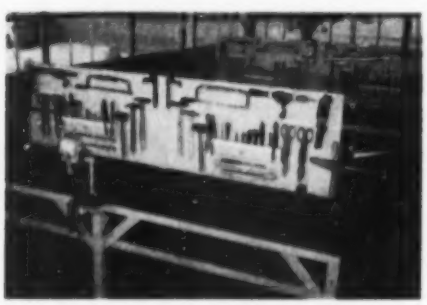

Fig. 5. Tool panels located at the work stations result in better tool usage and less confusion and traffic in the shop

It should never be necessary to send for a tool or a piece of equipment during the demonstration, yet this happens frequently. The way to avoid this delay and waste of time is to run through (or at least think through) the demonstration ahead of time, using the aids and tools in the proper order. Delay resulting from having to send for materials and tools during a demonstration is inexcusable.

The U. S. Naval School, Teletype Maintenance, Class C-1, Norfolk, Va., is using individual tool drawers with excellent results. In each drawer the student has all the tools for the equipment he is working on. This enables him to concentrate on the job to be done as he knows that all the

Fig. 6. Tools for a demonstration should be carefully selected

tools are available. At the end of each day the instructor, by merely glancing at the open drawers, which are designed to hold all the tools in a standard arrangement, can readily see if any tool is missing. If he discovers a tool broken or misplaced he can immediately fix the responsibility for it and replace or recover the tool. In addition to preventing the loss of tools, this system eliminates the confusion and time lost by students who otherwise would have to check out a tool kit each morning and return it each night. This type of tool drawer has saved time for both the students and instructors. Since this system has been in effect not a single tool has been lost. The combination of time and tools saved has greatly reduced the operating expenses of this school.

Distribution of Material

When students are to be given a number of instruction sheets, publications, charts, etc., during the period these may be placed on desks before the students arrive or they may be arranged in such a way that they can be passed out quickly as students come into the room.

Occasionally the break between classes may be used by the instructor and one or two individuals from the class to distribute

Fig. 7. Written material can be handed out as students enter the classroom

instructional materials to the desks or benches occupied by the students. Obviously, time spent by students going to and from a library or a central stowage space for instructional materials is time wasted. If this must be done a note to the librarian in advance indicating the exact material desired and the exact amount required will assist him in distributing the material quickly. If a good deal of mimeographed material is to be used during the course, consideration should be given to placing this all in notebooks before it is given to trainees.

Training Aids and Equipment

Much has been written about the proper use of training equipment and particularly training aids, but many instructors still take class time to decide just what they want to do during the instruction period. At times, of course, it may be possible for the instructor to set up needed equipment when students are otherwise occupied in some form of individual work such as working a problem or studying a diagram, but the training aids and equipment should be on hand. Pictures to be used with the opaque projector and slides should be arranged in proper order and right side up. One of the most distracting things in classrooms is to have the in-

Fig. 8. Have training aids and equipment ready

Fig. 9. A good lesson plan includes a time table

structor fumble with his training aids, put them in the projector upside down, or in the wrong order.

Some timesavers can be worked out in connection with the chalkboard. If the demonstration or lecture involves the development of an idea by sketches on the chalkboard it may be desirable to put part of the sketch on the board before class or perhaps to make rough sketches on a piece of paper to think through where these will be put on the available chalkboard space during the instruction. The alert instructor estimates the amount of space available for these illustrations and plans his instruction to make the best use of whatever chalkboard space is available.

Lesson Plans

Of course the lesson plan reflects the planning for the instructional period and should be a major help in saving time. A technique that many have found helpful is to put a time schedule on the side of the lesson plan. This merely helps to remind the instructor that he should be at a certain point in the plan at a certain time. This is particularly helpful with those instructors who tend to hold a class overtime because they cannot quite get the last idea across or have not quite made the assignment clear. Notes made on the lesson plan after class can save time when that plan is used again.

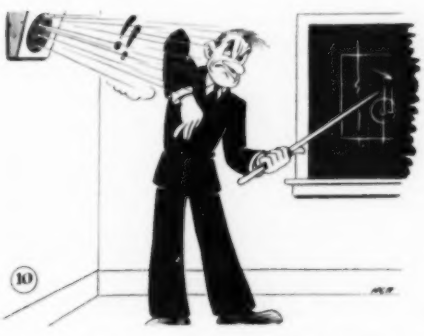

Fig. 10. Give the instructor a chance

Distractions

The administration should be careful about the use of loud-speakers and squawk boxes that interrupt classes. Instructors should be called from their classes only in the case of an emergency and never for the convenience of the administrative office. The practice of sending messengers into a classroom to deliver notes and information is bad. This information can almost always wait until the break. In one school it became the practice to shove notes under the door during the classs in order to avoid interrupting the instructor. This proved to be more distracting than having the messenger walk into the room. The instructor should try to have an ace or two up his sleeve to use when he faces unavoidable distractions such as an electrician's air hammer in the next room. Moving the class to another location or switching to some kind of individual practical work may be possible under these conditions.

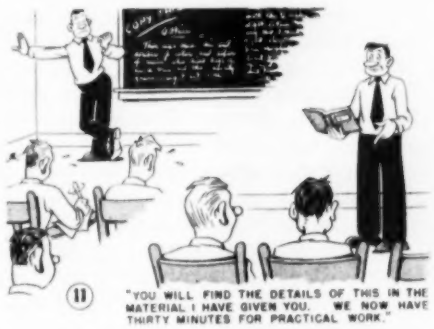

Fig. 11. Copying from the blackboard is not "learning by doing"

Written Instructions

Much time is wasted in some classes by having the students copy information from the chalkboard. If the material is worth giving to the students it should be duplicated and handed to them. Little is learned by copying. An equal amount of time spent studying the material and thinking about it will result in more learning.

A number of schools have made up notebooks containing outlines of the instruction with space available for student notes. This is an excellent practice and a great aid to the student in keeping his notes in usable form.

The Habit of Talking Too Much

The instructor who says more than is necessary is wasting time. The author admits that this is one of his pet peeves. He has seen instructors spend 20 minutes explaining something that could be covered in one sentence. As an experiment, you may want to make a recording of one of your lessons and then analyze this carefully to see if the material could have been presented with fewer words in less time.

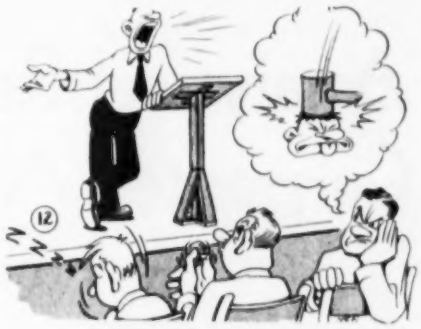

Fig. 12. Too much talking — not enough teaching

When you think you have put the subject across ask some questions of individuals in the class to test their understanding of what you have said and proceed on to the next part of the lesson as quickly as possible. The habit of looking for signs of restlessness and boredom on the part of students and of changing the approach to the lesson when this happens may make the difference between a dull lesson and an interesting one — a major factor in determining how long it takes to teach the lesson.

The progressiveness of the oil industry is indicated by a statement, made by the Aircraft Industries Association, that the oil industry flies more airplanes than do the airlines. Aircraft operated by oil companies aren't, on the average, as large as airline planes, and the number of passengers carried is much lower. However, the oil industry uses some 1723 planes, as compared with about 1400 belonging to the fleets of the scheduled domestic and international airlines. — *Petroleum Newsnotes.*

Bifocal spectacles were invented by Benjamin Franklin because with the lenses he wore for close paper work he could not recognize the famous personages at Paris social functions when he was American Ambassador. — *American Optometric Association.*

The New Jersey Turnpike required 30 million gallons of asphalt, of which 85 per cent was provided by oil companies doing business in New Jersey. — *Petroleum Newsnotes*

Analytical Results of a Carpenter Apprentice Program*

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Central High School
Fort Wayne, Ind.

For the past eight years apprenticeship has taken great strides forward in many locations of the nation. Too often the results of these programs have been analyzed subjectively rather than objectively. In this article it is our hope that we can show some of the positive results of one particular apprentice program. The figures gathered are far from ideal, but they definitely show some trends toward training more qualified mechanics to meet the tremendous needs of the trade.

The Carpenters' Joint Apprenticeship Committee of Fort Wayne made its first contact with the public schools to organize a program of related training in the summer of 1945. After the usual details of program organization, the class was formed and started its training at Central Vocational High School on September 19, 1945. As for an instructor, the committee picked a qualified journeyman who had spent 40 years at the trade. There were seven apprentices at that time. By June 10, 1946, the apprentice group had grown to 61. The first task of the Joint Apprenticeship Committee and the school was to provide the apprentices with a course of study that would meet the needs of the trade. After one year of research and intense work, a course of study was developed by the committee with the help of the school.

The brief history mentioned above is enough to show that this program started in similar circumstances to that of most programs throughout the country. Each item covered in the analytical part of the article was chosen to show that through an apprenticeship program, a trade has a greater source of mechanics than it has ever had in the past two decades.

Apprentices Graduated

During the past eight years 146 men have entered the carpenter trade in Fort Wayne and 85 of these men have been graduated from the program. Some apprentices started their training and found that the work was too hard or too skillful for them to master so they left the trade. Others went to service and came out only to find that their interests had changed while they were away from the trade. The above-mentioned figures show that 58 per cent of all apprentices starting the trade completed their training which means that approximately three out of every five men completed the trade they started.

Another fact which was gathered from the figures is that the contractors are mighty happy with this training. It is hard for a contractor to hire good foremen or superintendents unless they have had the men in their employ for some time. The survey showed that 16 of the graduating apprentices (11 per cent) became foremen. Three men became superintendents for a percentage of 2 per cent. The significant part of the above-mentioned figures is that the graduate apprentices did not have to wait until they were in the trade a great number of years to become bosses as every one of these 19 men mentioned was a boss within a few years of his graduation.

More Contractors, Too

Some of the graduate apprentices decided that they would rather work for themselves than another contractor and proceeded to set up their own organizations. Eight graduate apprentices are now licensed contractors which means that 6 per cent of the entire group became contractors. The apprentice training program is not designed specifically to train men to become contractors, but it has been found that the majority of the men, who were graduated from the program and became contractors, took extra training at some school of higher learning to help them in their venture. Fort Wayne is very fortunate to have an extension of Purdue University and many of the graduate apprentices have taken advantage of the Building Construction Technical Institute (after completion of apprenticeship).

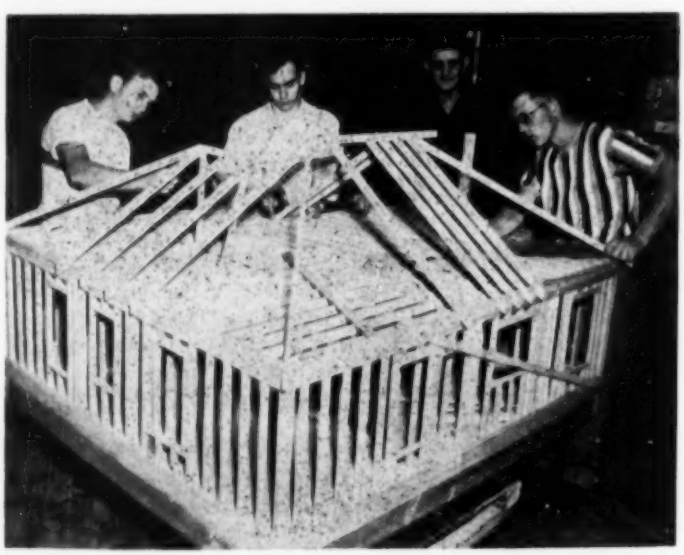

Fig. 1. Learning building construction by making a model

*Grateful acknowledgment is made to Fred H. Witte, Business Agent of Local 232 of the Carpenters and Joiners of America, for his help in assembling the following data concerning carpenter apprentice training in Fort Wayne, Ind.

The public schools have been very fortunate in securing good instructors with the aid of the Joint Apprenticeship Committee. One of the most outstanding features of the related training program is the fact that we have used three graduate apprentices to teach the related subjects. These instructors are all around 30 years old and have taken a real interest in apprentice training. One is a contractor and the other two are foremen. We now have two regular instructors who teach Trade Technology and Related Drawing, Mathematics and Blueprint Reading. We also have two substitute instructors who are able to fill in for the regular men. Looking toward the future, we are hoping to have all of these instructors teaching when the program expands.

Many of the graduate apprentices are now taking an active interest in helping other members of the trade administer the apprentice program by serving on the Joint Apprenticeship Committee. Throughout the life of the Carpenter program, we have had four graduate apprentices serve on this committee. Many times a man serving his apprenticeship criticizes the course of study and has just reason for this criticism. We try to get these men to serve on the Joint Apprenticeship Committee after they have been graduated so that we can use some of the suggestions that they made advantageously for the program. By this method we are able to improve instruction each year.

Another significant figure which is encouraging to the Carpenter trade here in Fort Wayne is the one which shows that 90 per cent of the apprentices who were graduated, remained in the trade. The majority of the men who dropped out did so for reasons of physical handicaps or things of that nature. The classes throughout the eight years have averaged 16 apprentices per year.

Trends

The graph shown in Figure 2 was drawn to show some results of the Carpenter program as compared with that of the entire Building Trades program. Looking at the over-all picture of the graph, we might draw some of the following conclusions:

1. The Building Trades definitely did something about meeting the needs of the various trades during the past eight years. The peak year of course was 1950 when we graduated many boys that started when they came back from World War II.

2. The carpenters have always graduated about 25 per cent of the building trades apprentices in Fort Wayne. Their program of training has been strong enough to attract good young men who have had the will to stay with the program until graduation.

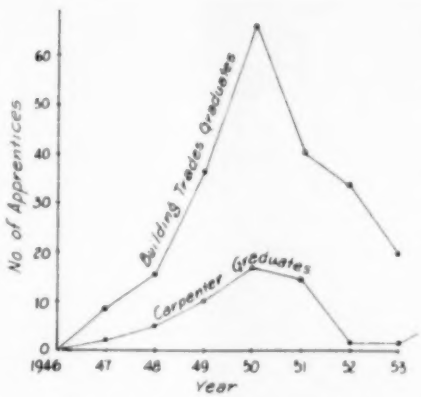

Fig. 2. Analytical results of a carpenter apprentice program

3. Even after 1950 the carpenter graduate curve is similar to that of the building trades except in one way. The building trades graduates have been decreasing since 1950, but the carpenter graduates have now leveled off and the indication at this time shows that the carpenter graduates will increase each year.

Things to Come

The future of apprentice training is in the hands of the individual trades. Each trade knows that it must train competent mechanics to meet the needs of the ever expanding building programs of the nation. In order to get the best apprentices available, the carpenters have started an extensive screening program. It includes personal interviews with the Joint Apprenticeship Committee and the business agent, verbal questions concerning mechanical experiences and written questions which check the apprentice's ability and sincerity in entering into and completing the training program. At this point it is proper to mention that the majority of the building trades are stressing quality rather than quantity by the above-mentioned method. Ever mindful of the changing methods of carpentry procedure, the Joint Apprenticeship Committee is revising the course of study of the related training program to meet these changes. Every year since the origination of the program, some items have been changed to point the related training program to modern up-to-date methods of on-the-job work.

It is the hope of the school that facilities will be improved in the next five years. Many times the related training program is curtailed because the apprentice classes are using the same facilities as the day school. We hope to provide separate rooms which would give the apprentices a chance to work on projects such as the one illustrated in Figure 1 without having to store their projects after each class. This type of work is positive in nature and can be evaluated in terms of on-the-job achievement. It is the hope of the school that the building trades apprenticeship training will rise to even greater heights in the next eight years than it did in the past eight years.

LAMENT OF A SHOP-TEACHER'S WIFE

ELIZABETH BERNARD SANDLIN
Duncan, Okla.

Oh woe is me!
My life, I see,
Is one continuous frustration.
Because my mate —
Oh, cruel fate! —
Teaches industrial education.

My friends all say
"How lucky the day
You were married to your handy man.
Furniture he can make
And fix what you break,
Can you want any more?" I can!

Like the cobbler's wife
I find that my life
Is a series of neglected requests.
"Now would you, Dear,
Drive this nail here?
This wish six times I've expressed."

And now you'd suppose
I'm about to disclose
That on my own, I've acquired the skill.
But alas and alack!
I can't drive a tack
And a buzz saw I can't tell from a drill.

All the people we know
Think we're made out of dough
And have time on our hands to burn.
"See that thing on the shelf?
Since you made it yourself
I'd like one the next time I return."

Other teachers galore
Arrive home at four,
But not my industrial husband.
He's still at the school —
A boy lost a tool! —
Besides, he must check on his fund.

But whatever betide
I could take in my stride
All else but this one final weeper:
"Oh, don't buy that —"
From a car to a cat —
"I can make it for you a lot cheaper!"

Students Survey Beginning Jobs

FRED BOWMAN
and
ROBERT HOPPOCK
New York University
School of Education
New York City

The student survey of local jobs for beginners is a technique that has been used less frequently than its possibilities warrant. What it may do for those who participate in it is suggested by what a sample of it did for a group of counselors in training at New York University.

These counselors were assigned to read a description of the technique in their text,[1] select about five questions they would like to ask employers, and then interview any three employers whom they could reach conveniently. The following day they were divided into groups of four, to discuss what they had learned, select the most interesting items, and report these to the class. Their reports indicated that from this one assignment they had learned that:

1. Many employers welcome inquiries from counselors and are glad to co-operate. A shop foreman in a large aircraft instrument plant said, "I'm always willing to help young people. I was once a young man myself and had no help from anyone, but many times could have used help from people like you."

2. Some employers are more concerned with the attitudes than the education of beginning workers. The manager of a sportswear manufacturing company said, "We have one boy here who runs errands and delivers packages, but I don't know whether he finished high school or not." Another clothing manufacturer said, "I don't think there is anything but a will to work hard, that boys need, and you don't teach them that."

3. Beginning wages vary greatly — from 50 cents to $2.25 an hour. The two highest paid jobs were for laborers, one in a construction company, the other in a food warehouse.

4. Employers can be just as kind as school teachers. The manager of a department store, paying beginners $34 a week, noted that he did not insist on previous experience and added "I even give delinquents a chance — someone has to."

5. Too much education can be a handicap in some jobs. The manager of a chain grocery store said, "I don't like to hire college people. They're seldom happy in this work."

Any resourceful teacher will see enticing possibilities for fruitful discussion in such employer comments as these, whether in counselor training or in a high school course in occupations. What attitudes do employers want? Do we want to develop such attitudes? How do we do it? Why do people work for 50 cents an hour when they might earn $2.25? Are there better advancement prospects in the lower paid jobs, or is this idea just a popular fallacy? Which employers will give a beginner a chance? What is the best amount of education to have for different jobs? Are these answers representative or do we need a bigger sample of employers?

The questions asked, the employers approached, the topics discussed in class may vary with the nature of the course, the purpose of the instructor, and the interests of the class; but there appears to be evidence here that the technique has a considerable potential of learning experiences, and that it is worth including in programs of counselor training and in courses in occupations for high school and college students.

[1]Chapter 8 in *Group Guidance* by Robert Hoppock, McGraw-Hill Book Company, New York, N. Y.

Teaching Printing by Means of the School Newspaper

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If the work is properly planned, carefully organized, and faithfully carried out, the school newspaper can become one of the most valuable of vehicles for the teaching of printing. Careful planning and organization is essential because of the time element in meeting deadlines and because of the varied nature of the work.

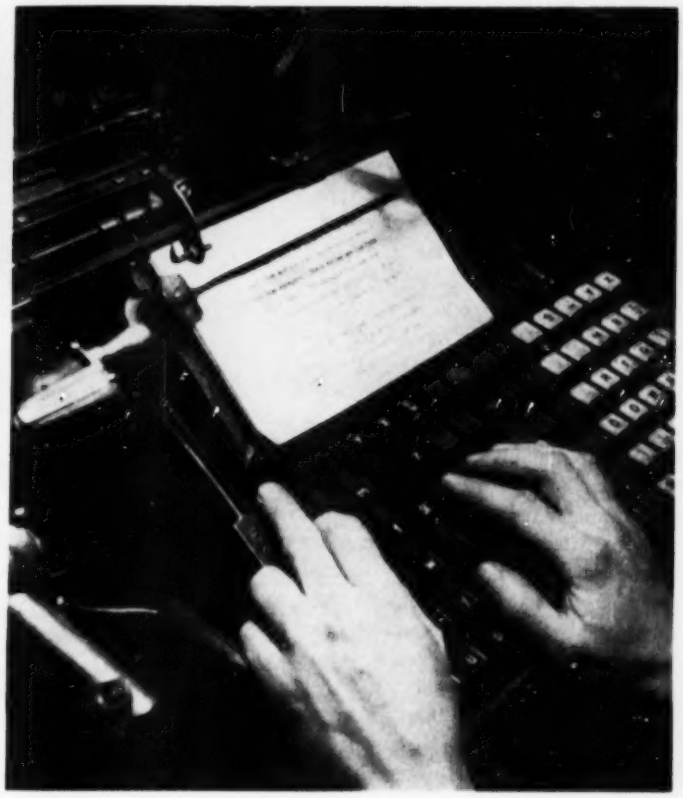
Motivation is probably higher on the school newspaper than on any other type of work done in the school print shop. Students revel in seeing the product of their work used and this feeling is at its highest when classmates, parents, and teachers see the results of their efforts.

Correlation with art, mathematics, English, journalism, and chemistry classes is another advantage and may be employed in whatever degree the instructor desires. A student likes to have a teacher follow his efforts in other fields of work and printing may very well become the core of a student's high school program.

Meeting deadlines — the absolute necessity of getting work done on time — is an essential in newspaper work and is a lesson that is valuable in any field. Meeting deadlines should not be a burden and properly supervised it need not be. Working in co-operation with other students is essential on newspaper work and this also is a valuable trait for students to develop.

The practical value of producing the school paper in the print shop is another justification and incentive for adapting this project to the printing course. Many schools find it prohibitive financially to sponsor a paper printed commercially. This

Setting type by hand



Operating a Linotype

fact enhances the importance of the project in the eyes of the printing students who participate in the production. A definite limit on other forms of production of less instructional value is necessary, however, if the paper is to form the basis for the printing course.

The informality and realness connected with the publishing of a newspaper duplicates a life situation and gives students' work and study an easily recognized purpose and provides a valuable tie-up with community life.

A great variety in the types and difficulty of work is available also, making it possible to find work for students with varying degrees of skill. All aptitudes and abilities can be provided for and progressive advancement is possible as a student improves.

One of the pitfalls of a school newspaper is the retention indefinitely of a student on a certain operation of production because he has become proficient at it. He does not learn new operations and his monopoly of a machine or a process precludes the possibility of others learning that which he is doing. If the plan herewith described is followed this danger is avoided.

It is desirable and usually necessary to have such a project as the school newspaper operating in all classes throughout the day. There is usually enough work and properly distributed it does not become a burden on a few. To expedite such an arrangement the author has found it advisable to use an *Unfinished work bank*, where articles, stories, heads, or ads may be picked up in any period at the point where they were left in the preceding period. Complete and accurate directions must be marked as to size and kind of type, page number, length of lines, etc., on all such work and copy left in the galley with unfinished job. Also valuable is a check-off sheet on which completed portions of work are recorded and initialed by students who complete them.

How to Do It –

Let us presume there are 60 beginning students registered for the printing course and they have been divided into four groups of fifteen each. When they report for work the instructor will begin their orientation with a study of several newspapers, a product of printing that they see each day. He will display several daily and weekly newspapers, tell a little about the kinds of work available on these papers, aided perhaps by charts, explaining something of the allied fields dependent on the printing of newspapers. He will then display some high school newspapers, including the school's own newspaper, if there is one, and then tell them of the work they can do to help produce an attractive weekly or monthly publication for themselves and their classmates. He can display the accompanying Chart I, listing the various kinds of work done on each issue of the paper. The students will be able to visualize their progress on the paper from one kind of work to another. Routing Chart II is a schedule of work that may be followed for a school year of 40 weeks.

It is well to apprentice each beginning group to an advanced student. In the simpler operations one advanced student may supervise several beginners, but as the apprentice learns and advances to more difficult work he may serve under one *journeyman* only during the learning

period. The advanced students learn a great deal from this procedure, too, and glory in their work of teaching. "Where one would teach, two must learn." If the plan is being initiated in a school where there has been no newspaper, the instructor will, of course, have to teach each new operation. It will be necessary for the instructor to plan ahead and schedule several advanced students in each class to act as assistants, students who have had experience and who are capable of carrying on the work connected with the printing of a newspaper.

For a school without a linotype, individual *takes* of copy, small at first, longer as the student acquires speed, are cut up, numbered, and distributed to each student. After preliminary instructions on how to hold stick, place case on cabinet, place slug in stick, student can start to compose his *take* by referring to chart of California job case. He should, of course, memorize the locations of the letters as quickly as possible. At first an advanced student can empty the beginners' sticks and assemble takes in proper order. Students' names are written on takes and after proof is read each one sees his own errors. Corrections are made by an advanced student until beginners have observed and noted how this is done.

Even in a shop that has a linotype it may be advisable to hand set one page. This will relieve the pressure on the few students who can operate the machine and also provide a live project for beginners. Each student will keep a string of clippings of material he sets. One class may complete one editorial, another a feature story, another an interview. As related work they learn about good spacing, history of printing, American journalism, printer's English, and the point system.

As soon as a student becomes proficient in setting and handling straight matter he advances to more difficult work. It is not necessary or desirable that all the members of the class be engaged in one kind of work. Three or four boys may be taken aside and given a demonstration and practice in how to sort leads and slugs, cast cuts, use the saw, wash rollers, and other fundamental operations.

A printed chart of types used in headlines should give character count of each. Such a chart is necessary for the headline writers on the editorial staff. It also is a guide to the printing students in learning type faces and sizes.

Sawing a border for an advertisement in a school newspaper

Even two- or three-color work may be tried and this makes interesting variety at special seasons of the year such as Christmas, Thanksgiving, Easter, or Halloween. Linoleum blocks work in well on such projects.

Advertising typography is one of the most valuable phases of newspaper work for teaching principles and procedures in printing. Ad layouts should be supplied to the beginner and should be very carefully marked as to size of ad, size and style of types, length of line, spacing, position of illustrations. As he delves deeper into the study of printing, the student will

CHART I. Operations, Related Technical, and Teaching Results of Work on High School Newspaper

Shop Work or Operation on Newspaper	*Related Technical*	*Teaching Result*
1. Set simple heads 2. Set straight matter 3. Empty stick 4. Tie up type forms	Use of stick, case, leads and slugs History of printing Study of high school papers	Learn use of stick Learn layout of case Justification, spacing Skill in handling type
5. Wash rollers 6. File cuts, standing heads, ads, articles, papers 7. Fold papers 8. Rout stereotypes 9. Cast stereotypes	Roller composition Paper — (kinds, uses, how made) Study of type metals	Practical use of chemistry Care of materials and equipment Skill in handling paper Use of machines Safety
10. Proofreading 11. Set boxed and 2-color heads 12. Set poetry 13. Read type 14. Set ad "guts" 15. Set initial letters 16. Distribute type	Proof marks Printers' English Office style Movies on journalism	Drill in punctuation, capitalization, abbreviations, division of words, English usage, vocabulary Orderliness Ability to follow copy
17. Make corrections 18. Feed press 19. Oil and care for press 20. Set ad display 21. Cut paper	Kinds of presses Principles of display composition Printers' mathematics Movies on papermaking Study of levers on cutters	Accuracy Skill in co-ordination Safety
22. Make-up from page dummy 23. Set and assemble complete ads 24. Saw slugs and stereotypes 25. Cut and miter borders 26. Cut linoleum block illustrations	Printers' point system Type face recognition Movies on letterpress printing	Ability to follow directions Practical application of mathematics Skill in handling tools Understanding of appropriateness of type faces
27. Lock up 28. Impose 2- and 4-page forms 29. Take page proofs 30. Presswork (make-ready) 31. Operate and care for Linotype[1] 32. Lay out ads 33. Markup copy	Field trip to newspaper Printing plates Study of margins Chemistry of inks Movie on ink making Art work — lettering Comparison of different typesetting machines	Visualization Development of judgment and taste Neatness Knowledge and understanding of diversified work on newspapers Practical application of chemistry Skill in drawing

[1] A course in Linotype may be offered as a complete unit in itself with a textbook on the care and maintenance of machines, but every student who works on a school paper should have an elementary introduction to this work.

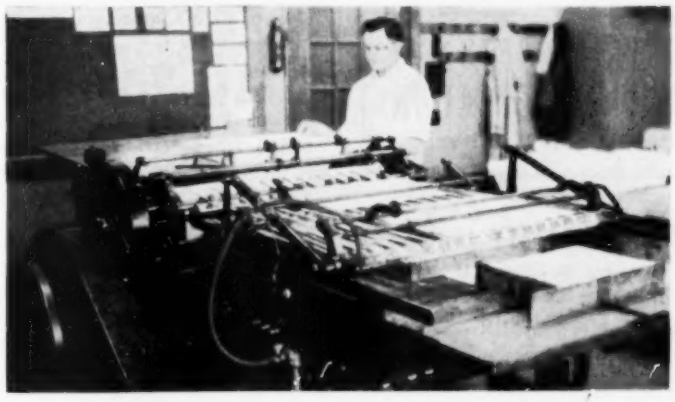
These units or shopwork operations are not all necessarily arranged in order of difficulty.

learn more about types, and principles of display and should be given an opportunity to design and lay out ads.

After students have learned how to set type — heads, ads, and straight matter — and have acquired some skill in handling type, they progress to page make-up and lockup, working from a page dummy supplied by the editorial staff.

Before beginners are allowed to feed a press they should be drilled thoroughly in safety precautions and safe practices. They should become familiar with the action of the press by feeding blank stock before feeding a live job.

Movies on the making of newspapers are available and valuable as related material and should be spaced and alternated with field trips to newspaper offices. Film strips and slides on journalism, advertising, and letterpress printing, and offset and gravure printing, help maintain interest and teach methods and practices in use. Movies on the making of paper and ink are available also and tie in well with the school newspaper.



Feeding a school newspaper on a small cylinder press

It would be well to plan field trips to newspaper offices and to present movies on weeks when the paper is not being published.

As a boy tries out the various kinds of work available he may, and usually does, find a liking for a certain kind of work and he may stay in that branch and become more and more proficient at it. However, from the standpoint of general education he should try his hand at all of the tasks to be done on the newspaper. In that way he has firsthand knowledge of the whole operation. After he has acquired this overview he may select one branch that he likes and can do well and continue to improve his skill. A student who has artistic ability may continue to make ad layouts, cartoons, drawings, carve linoleum blocks; a student who has a liking for machines and who has good coordination, may advance rapidly on the linotype or cylinder press. Each should find his place and be happy in it during his high school printing course.

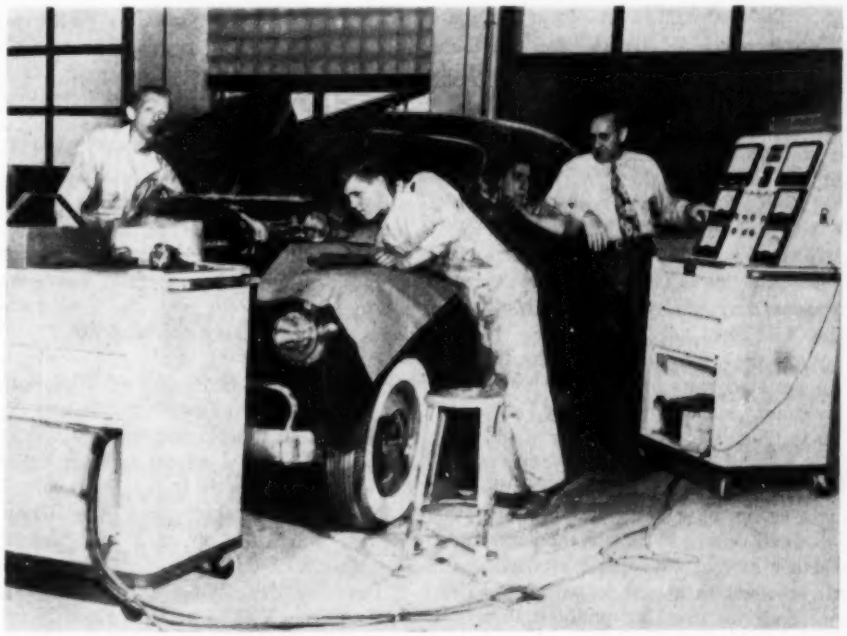
Thus an entire course of study in printing can be planned and built around the school newspaper.

CHART II. Routing Chart for a Class Divided Into Four Groups

(Numbers refer to work units on Chart I.)

Week No.	Group 1 Operations	Group 2 Operations	Group 3 Operations	Group 4 Operations
1	1-3	2	5-6-7	R.T.
2	2-16	5-6-7	R.T.	1-3
3	5-6-7	R.T.	1-3	2
4	R.T.	1-3	2-16	5-6-7
5	8-9	1-4-10	2-11-16	R.T.
6	1-4-10	2-11-16	R.T.	8-9
7	2-11-16	R.T.	8-9	1-4-10
8	R.T.	8-9	1-4-10	2-11-16
9	14-15-16	11-17-20	12-13	R.T.
10	11-17-20	12-13	R.T.	14-15-16
11	12-13	R.T.	14-15-16	11-17-20
12	R.T.	14-15-16	11-17-20	12-13
13	1-18-19	2-16-21	22-23	R.T.
14	2-16-21	22-23	R.T.	1-18-19
15	22-23	R.T.	1-18-19	2-16-21
16	R.T.	1-18-19	2-16-21	22-23
17	16-17-20	23-25	2-16-24-26	R.T.
18	23-25	2-16-24-26	R.T.	16-17-20
19	2-16-24-26	R.T.	16-17-20	23-25
20	R.T.	16-17-20	23-25	2-16-24-26
21	27-29	30-31	32-33	R.T.
22	30-31	32-33	R.T.	27-29
23	32-33	R.T.	27-29	30-31
24	R.T.	27-29	30-31	32-33
25	23-31	16-28	1-2-18-27	R.T.
26	16-28	1-2-18-27	R.T.	23-31
27	1-2-18-27	R.T.	23-31	16-28
28	R.T.	23-31	16-28	1-2-18-27
29	10-31	16-32-33	2-22-23-30	R.T.
30	16-32-33	2-22-23-30	R.T.	10-31
31	2-22-23-30	R.T.	10-31	16-32-33
32	R.T.	10-31	16-32-33	2-22-23-30
33	30	31	2-16-22	R.T.
34	31	2-16-22	R.T.	30
35	2-16-22	R.T.	30	31
36	R.T.	30	31	2-16-22
37	23-32	31	2-16-22	R.T.
38	31	2-16-22	R.T.	23-32
39	2-16-22	R.T.	23-32	31
40	R.T.	23-32	31	2-16-22

R.T. = Related Technical — includes study, movies, lectures, demonstrations, field trips.



Engine students at the Tucson, Ariz., Sr. High School.
Instructor, A. J. Eager

Photo by Olga Acevedo, advanced photography student of the graphic arts department. Submitted by Harry A. Goldstein, instructor of photography

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

JOHN J. METZ, Editor

VACATION SAFETY HINTS

Now is the time to do a little prevacation admonitory work with your students. Boys and girls are all too prone to take chances. If you call their attention to some of the dangers which they may encounter during their vacation, your efforts may save their lives. It is worth trying.

The May, 1954, *Safety Education* magazine contains some very good hints on how to keep the youngsters safe this summer. It will assist the earnest teacher in helping his students to have a safe time while having a good time.

When we think of dangers we usually think of what may happen to the young on the streets and highways. Starting with accidents that are likely to happen to unsupervised youngsters when strolling about or playing in the streets, probably the first caution to give is to be very careful when crossing or walking on the highways.

According to 1954 Book of Street and Highway Accident Data, distributed by The Travelers Insurance Company, Hartford, Conn., there were 8600 pedestrians killed by automobiles in 1953. Of this number 410 were children playing in the street, and 800 were pedestrians walking on rural highways. If we can get our youngsters to be more careful when they are walking on the highway and if we can keep children from playing in the streets, we will be instrumental in saving quite a number of valuable lives.

Have you ever had a severe sunburn? If you did you will not want another. Urge the youngsters to avoid overexposure to the sun's rays. The effects of such overexposure may spoil the rest of their vacation. Tell them not to nap in the sun.

Warn the young vacationers against the dangers of coming in contact with poisonous plants such as poison ivy, oak, and sumac. Handling any of these plants may be a painful, and even costly experience.

Warn them also against the indiscriminate eating of wild berries found in the fields and woods. If there is the least doubt whether any of the plants or berries are edible — tell them not to eat them. That also goes for drinking polluted water. It is better to boil all water that is used while on hikes or camping trips.

The "Home Building News," published by the National Association of Home Builders, 1028 Connecticut Avenue, N.W., Washington 6, D.C., in one of the late issues of its News Service, states that vandalism by school-age youth increases the cost of building a new home by sums varying from $60 to $300. These facts were revealed by a nationwide poll recently conducted among the members of this national association.

This study also discloses such inexcusable acts of vandalism as the following. In Detroit, Mich., a youngster climbed into a bulldozer and drove it into a new house at a cost of $650. In another teen-age incident, three new houses went up in flames.

Pranks such as these, and theft, cost Detroit builders and homeowners thousands of dollars, but the cost in child injuries also is serious and costly. Trespassing and climbing around new structures is unlawful and causes much loss of life. Discourage careless tree climbing.

Warn them against playing with discarded iceboxes, refrigerators, freezers, and other air tight cabinets.

Swimming, diving, fishing, and boating are all pleasant vacation pastime occupations, but caution must be observed in all of them. Talking to the students about these items may help them live to enjoy future vacations.

DR. HOMER J. SMITH'S TESTIMONIAL BANQUET

Those of the readers of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION who know Dr. Homer J. Smith, professor and head of the Department of Industrial Education at the University of Minnesota, were not surprised at all when on April 30, 1954, at 6:15 p.m., approximately three hundred and fifty friends gathered at the Coffman Memorial Union at the University to honor the man who has worked for 35 years preparing men and women to teach industrial education.

The testimonial banquet was a real exemplification of the esteem in which this modest, unassuming, sympathetic man was held by his colleagues and students.

Dr. Raymond G. Price, professor of education at the University of Minnesota, made an excellent presiding officer.

Each of the speakers re-emphasized the universal feeling of esteem and admiration in which Dr. Smith is held not only in Minnesota but throughout the United States, practically in each of which he has spoken at one time or another.

Probably the tribute given him by the radio station WCCO on their Good Neighbor Time Program, expressed the general feeling as well as it could be stated.

"This is a tribute to a teacher of teachers. After twelve years of serving the youth of his native Wisconsin as a teacher and principal, Homer J. Smith was called to serve at the University of Minnesota. In June of 1954 he will be retired after completing thirty-five years of service as professor and head of the Department of Industrial Education.

"The worth of his service is attested by the calls made upon him to serve on local, state, and national committees. There is further evidence of his capacity in books and professional articles bearing his name. Professional awards further elaborate upon the valuable service he has rendered in the field of industrial-teacher education.

"It may truly be said that Homer J. — as his students affectionately refer to him — has such a grasp of the subject matter, organizes it so well, and then presents it so clearly and simply that many feel it is almost too easy to learn. A true evaluation reveals that his greatness, however, is due in a large measure to his humanitarianism.

"He has served as adviser to undergraduate and graduate students alike. But, he was more than an adviser, for his natural kindness led him to be more like a father to his men — inspiring, encouraging and guiding them to truly serve the youth of the Northwest. During this period he has served thousands of men in the Northwest as well as students from virtually all of the states of the Union. The significance of this contribution is great for his service has helped both teachers of industrial arts and teachers of vocational trade courses. It may be said with assurance that these teachers have transferred his mark upon an army of junior and senior high school youth in the Northwest. To this must also be added the vast number of vocational school students and adults in evening school classes.

"This man — a great teacher of teachers — deserves recognition by all the Good Neighbors of the Northwest."

And may the writer add — by all those interested in industrial arts and vocational education throughout the civilized world.

THAT NEW ADDRESS OF YOURS

We are again confronted with the opportunity and the need of calling to your attention the fact that if you are going to change the mailing address, at which you received the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine last year, it is very necessary that you notify us at once so you will not lose any of the 1954–55 issues.

We need not tell you that lost copies of the magazine are not easily replaced. Kindly, therefore, send your new address to our circulation department. Please see that this information reaches us no later than August 15, 1954. Be sure to give us your old address as well, and don't forget your zone number.

Modern Trends in Industrial Arts and Vocational Education

JAMES A. PARKER
Phelps Vocational High School
Washington, D. C.

Vocational education and industrial arts have for a long time been considered the *stepchildren* of general education, yet both have been advanced despite the following facts: first, the lack of uniformity in philosophy within the ranks; second, that vocational education has been the dumping ground for the juvenile delinquent, the *problem child*, and the mentally retarded student.

Vocational education and industrial-arts education have passed through periods of progress; periods of "laissez faire" but are now passing through the *renaissance* period, where educators, businessmen, legislators, union leaders, and the common man are deciding that vocational education and industrial-arts education have a very definite place in general education and can and will do much for the child of today, who will be the man of tomorrow.

In an ever changing democratic society, such as we have here in America, it is necessary that the members of this society be trained so as to take their rightful place in it. In order to do this the many agencies of society must follow the trends so as to organize and help young people to perform their duty in a highly efficient manner. Vocational education and industrial-arts education are two of the agencies that are attempting to follow trends and thereby participate in the molding of the work habits and skills of the young and old members of society.

Purposes of Vocational and Industrial-Arts Education

The main purpose of vocational education, as described under the Smith-Hughes Act of 1917, the George-Deen Act of 1936, and the George-Barden Act of 1946, is to train for useful employment in trade, industry, agriculture, business, homemaking, vocational-technical, and other pursuits, by giving courses of less than college grade. Homer J. Smith said, vocational education is to get people ready and to help keep them ready for the types of service we need. Another purpose is to give people experiences that enable them to carry on successfully a socially useful occupation.[1]

Industrial-arts education is to develop basic skills in, and an understanding and appreciation of, useful and practical arts.

Industrial arts and vocational education are concerned with the whole-life training of every boy and girl as he or she grows into manhood and womanhood. They are further concerned with the problems of readjustment which present themselves from time to time in the lives of our citizens.[2]

General Trends

Listed are some of the general trends that are taking place in every section of our country more or less:

A. In Industrial-Arts Education
   1. General-laboratory classes. At the nonvocational levels of elementary and junior high school emphasis is being placed on the activity types of learning.
   2. Industrial-arts education for all. For boys and girls not as a beginning for trade education but as an avenue to a liberal and appreciative understanding of industrial life for boys and girls.

B. Vocational Education
   1. Gary Plan, developed under Superintendent William Wirt, provides for industrial experiences in a series of productive work under the instructorship of an experienced tradesman.
   2. Ellinger Plan developed by Dr. William Ellinger. A unit shop plan in which a student gained experience in a series of unit or special shops.
   3. Pittsburgh Plan of Shopwork. The first year is used to discover the boy's aptitudes and interests by putting him in a general shop and later placing him in a unit shop.
   4. The Williamsport (Pa.) Plan and the New York State Plan. A type of vocational-technical course, which provides for engineering and scientific college entrance as well as trade and technical training.

C. General Vocational Training. Tendency to prepare for adaptability to changing economic conditions.

D. Scientific Knowledge. As industrial arts becomes increasingly recognized as general education, emphasis upon related scientific knowledge and social habits is increased.

The Exchange Classes of Baltimore, Maryland

In 1943, exchange classes in shopwork and home economics were started in Baltimore, Md. The boys taking some home economics and girls taking shopwork in one of the junior high schools were tried experimentally and having proved satisfactory were extended to other junior high schools in the city. In the fall of 1945, the new curricula for the senior high schools included industrial arts as a required subject for all tenth-grade boys thus making it a requirement for all boys from grades seven to ten inclusive.

These same curricular revisions also established two strictly industrial-arts curricula in the senior high schools: the general technical curriculum for boys not planning to attend college, and the college

[1] Struck, Theodore F., *Vocational Education for a Changing World* (New York: John Wiley and Sons, Inc., 1945), pp. 6-7.

[2] Johnson and Fenn, *Fundamentals of Industrial Arts and Vocational Education* (Chicago: The Goodheart-Willcox Co., Inc., 1943), p. 30.

preparatory curriculum devised to assist in the preparation of students for entrance into engineering college.[3]

Apprenticeship and Guidance

1. Training for apprentices: Apprenticeship has long existed as a vocational education problem. Long before the birth of Christ, the people of the Roman Empire and China taught trades by the apprenticeship method. Our early colonists brought the apprenticeship type of vocational training with them when they arrived in America, while the craft guilds nurtured it.

The War Manpower Commission and the United States Office of Education organized the apprenticeship-training service in order to help train persons during the war period, while the Committee on Post War Vocational Education has stressed the importance of such a program in training our veterans because that program, besides being very efficient, does do much to promote mutual understanding and co-operative relationships between industry and vocational schools.

When this training is supervised by the public school as it is being done in many sections of the country, the student learns a good trade and at the same time earns money. The Essex County Vocational and Technical High Schools of Newark, N. J., are doing on excellent job in this respect.

2. The place of guidance in apprenticeship: Educational and vocational counselors are confronted with their greatest challenge now that the nation is attempting to carry out peacetime production as well as reconvert certain industries for a war, and in the meantime a record number of young and middle aged people are seeking either employment or an education.

Four groups of people seem interested in entering occupations: first, about two million young men and women, who normally each year enter the occupational world; second, former servicemen and women, along with many nonservicemen who hope to get out of the draft; third, persons who had hoped to enter college but who due to marriage, must earn a living; and fourth, many persons who want to get into newer types of jobs.

The apprenticeship programs have increased from 4500 establishments in 1944, to 13,600 in 1946 with a number far beyond that of 1946 at the present time. The vocational teacher must give thought to future employment opportunities and encourage the people to become craftsmen, enter service trades, transportation service, building trades, prepare to become builders of machines, technical men, and good maintenance men.

The apprenticeship seeker should be told exactly what apprenticeship is, the term of his training, what wages he can expect, how the training program is administered, and the benefits he may derive after he becomes a craftsman. The apprenticeship seeker should be mentally, physically, and emotionally suited for the trade he wants to enter.

The vocational-guidance counselor should by all means try to interest apprentices for the building trades since housing for both veterans and civilians is America's No. 1 project today.

Veterans being older and more mature need a different type of counseling than the younger men who formerly constituted our apprentices. Good counseling will save veterans and nonveterans precious time in preparing and choosing their lifework. All persons should be informed that an adequate apprentice training will always be approved by and registered with a state or federal agency. Above all the veteran should be told about his rights under the G.I. Bill.[4]

Grants-in-Aid

Noting the changes in the federal and state grants-in-aid is indeed one excellent method of watching the over-all trends in vocational as well as industrial-arts education.

1. Federal: Federal funds for vocational education were for the purpose of stimulating states and local communities to set up their own occupational training programs.

The Smith-Hughes Act of 1917 was the first major federal appropriation act for vocational education at the secondary level. The acts that followed, such as the George-Reed Act of 1929, the George-Ellzey Act of 1934, the George-Deen Act of 1936, and the George-Barden Act of 1946 have been in the form of appropriation of authorization rather than appropriation acts.

The George-Deen Act of 1936 extended the scope of vocational education. This with the Smith-Hughes Act provided for long range programs. Now that the George-Barden Act has taken the place of the George-Deen Act, one can see that the vocational education program is headed for a banner era, since the George-Barden Act has the good features of the George-Deen Act plus new features that really do broaden the scope of vocational education thereby giving educators an opportunity to provide more training to a much greater number of persons.

2. State: Federal funds influenced the enacting of state laws or acts, since only by doing so could certain states take advantage of the federal funds. Most states not only match the federal funds as required by law but have gone far ahead and increased their share. Listed are some of the acts as instituted by several states:

1. *Arkansas.* In 1941, Acts 295 and 261 provided for the establishment of the Arkansas State Trade School.

2. *Illinois.* Has increased appropriations for vocational education by 48 per cent.

3. *Indiana.* In 1941, the legislature decided that official travel of vocational teachers could be a reimbursable item in the cost of vocational education.

4. *New Jersey.* In 1940, eliminated the compulsory continuation school law. This was accomplished by stepping up the compulsory age for attendance in public schools to 16 years of age.

5. *North Carolina.* Instituted the Machinery Act which permitted county and city administrative units to levy an ad valorem tax for the support of vocational education in agriculture, home economics, and trades and industries without a vote of the people.

6. *Ohio.* In 1942, had an act for the creation, administration, and financing of joint vocational school districts.[5]

Conclusions: By observing the general trends in vocational and industrial-arts education; the new curriculum as introduced in the city of Baltimore, Md.; the trends in apprenticeship and guidance; the ways that the federal and states grants-in-aids make more vocational education available to more people, one can see the growth of vocational and industrial-arts education.

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[3]Pawelek, Stanley J., *Industrial Arts Education, 25 Years of Progress of Educational Services of The Division of Vocational Education in Baltimore.* Department of Education, Baltimore, Md., p. 14.

[4]Patterson, William, F., "The Place of Guidance in Apprenticeship," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION (Milwaukee, Wis.: The Bruce Publishing Co., Vol. 35, No. 7, Sept., 1946), pp. 285–287.

[5]Dennis, L. H., "Legislative Commitments Affecting Vocational Education," *Forty-Second Yearbook, Part I* (Chicago: The Department of Education, The University of Chicago, 1943), Chap. 10.

The trend seems toward considering vocational and industrial-arts education an important phase of American education. Industrial-arts education and vocational education are fast becoming a definite part of general education. The people in all stages of society are beginning to believe that vocational and industrial-arts education are going to meet many of the needs that other forms of education have been missing.

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PROBLEMS AND PROJECTS

BIRD FEEDERS MADE FROM TIN CANS

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Instructor

Manly Junior High School

Louisville, Ky.

Home mechanics teachers frequently find that projects made of tin cans interest their pupils and are economic in the use of equipment and materials. Such projects also may develop interests in worth-while hobbies. This interest may be in pleasing Mom with a sprinkling can to water her potted plants, or in showing her what he can do with cans that she throws away. The pupil may get interested in birds through making birdhouses from tin cans — an undertaking which can prove both practical and attractive.

The bird feeder described in this article has become as popular with our seventh-grade boys as the birdhouses, sprinkling cans, and wall pockets for flowers, that are commonly made. Making the bird feeders gives the boy experience in a variety of tool operations, and requires but a minimum amount of material taken from regular stock. With the exception of the $\frac{3}{16}$-in. iron rod upon which the entire project is assembled, the only other material required is tin cans. If no large cans are available for making the roof and the bottom, sheet metal may be used.

Procedure

1. Make the bottom from the end of a gallon can. It is 1 in. high and has a turned edge. The edge may be wired. A $\frac{3}{16}$-in. hole is drilled in the center.

2. Use a 3- to 4-in. can to make the hopper section. Remove the top of the can completely, and solder a strip of tin that is $\frac{5}{8}$ in. wide across the center of it. The ends of the strip should be crimped over the edge of the can top. If the edges of this tin piece are folded, a better support is gained. This brace keeps the hopper lined up straight, and a $\frac{3}{16}$-in. hole is drilled in the center of it before it is soldered. Drill another $\frac{3}{16}$-in. hole in the center of the can bottom. Now lay out two semicircular openings 1 in. in diameter at the bottom of the can. These openings are opposite each other. They may be cut with aviation snips.

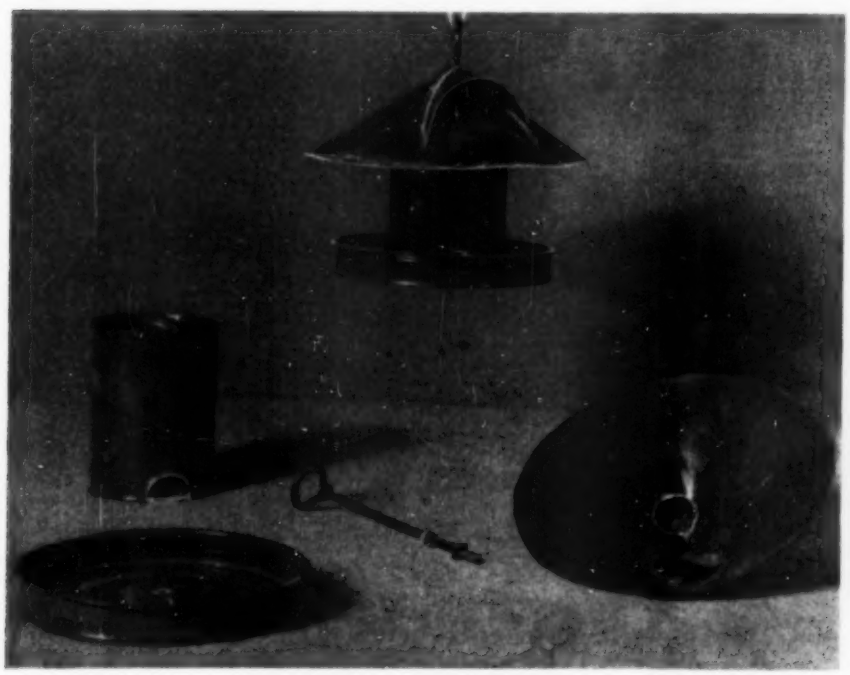
3. Make the top section large enough to overhang the bottom piece, and at what pitch you desire. This conical shaped piece may be soldered or riveted together. A $\frac{3}{16}$-in. hole is drilled at the apex, and a 1-in. hole is cut with its center 1 in. from the apex. Cut this opening opposite the seamed ends. A hood is laid out to cover this hole and serve as a means of filling the feeder. This hood is soldered on.

4. Make the assembling rod from a $\frac{3}{16}$-in. round rod. Form a 1-in. ring on one end, and thread the opposite end to fit a $\frac{3}{16}$-in. nut. A $\frac{3}{16}$-in. washer can be used at each end of the rod. The rod must, of course, be long enough to project through the entire assembly.

5. Clean the parts with steel wool, and paint both inside and outside a dark green or some other dark color.

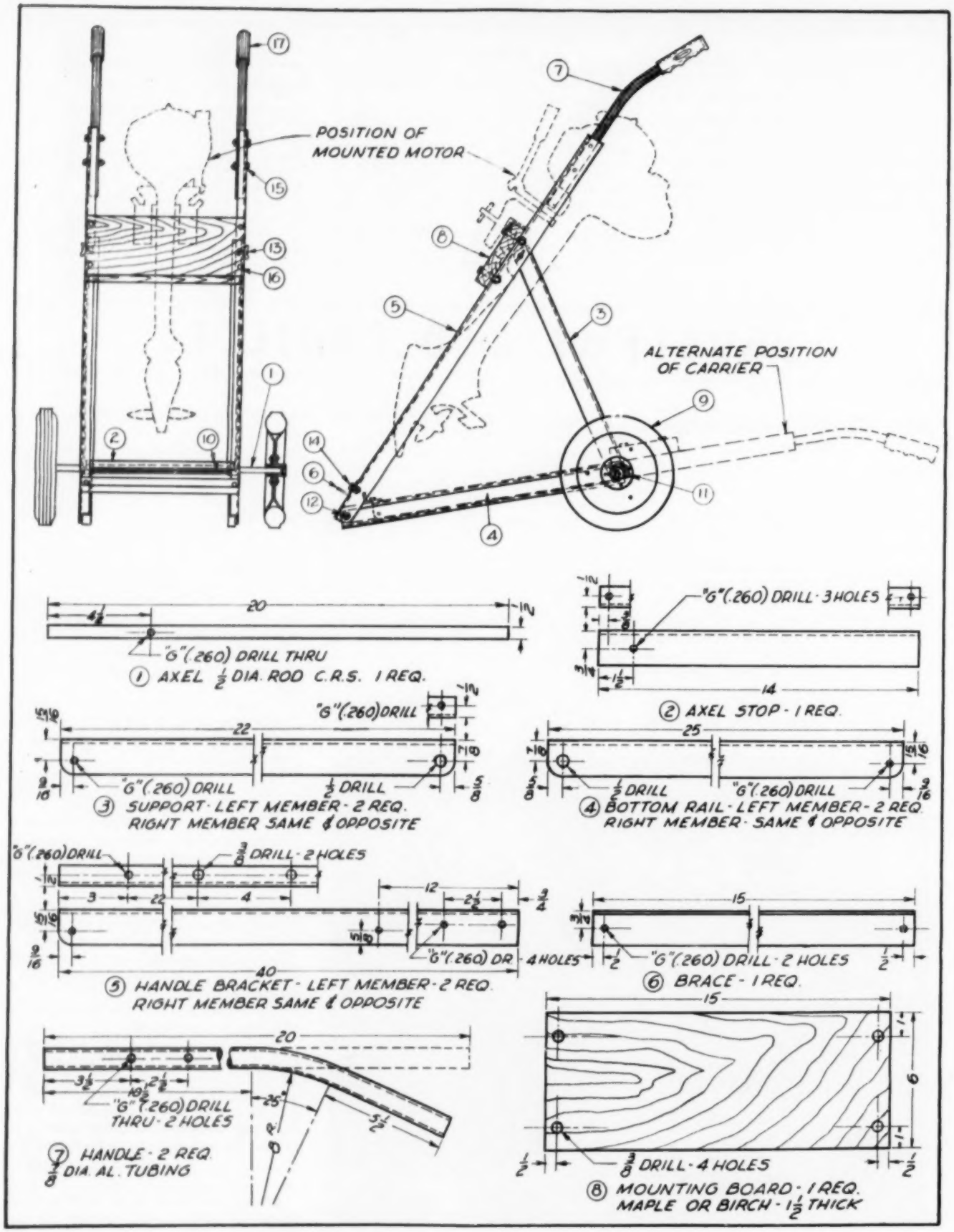
6. When dry, assemble, and cut off the projecting part of the rod.

The feeder may be hung with a chain from a tree, porch support, or other projection. An ornamental iron or wood bracket can be made in the shop as a support for the feeder. Whatever means is used to hang the feeder, be sure it will be possible to tilt the feeder while pouring the feed through the hood section.



Tin-can bird feeder

Before God there is no difference between the newest apprentice and the factory owner. — *Joseph Cardijn.*


POSITION OF MOUNTED MOTOR
ALTERNATE POSITION OF CARRIER
1 AXEL ½ DIA. ROD C.R.S. 1 REQ.
"G"(.260) DRILL THRU
2 AXEL STOP - 1 REQ.
"G"(.260) DRILL - 3 HOLES
3 SUPPORT - LEFT MEMBER - 2 REQ.
RIGHT MEMBER SAME & OPPOSITE
"G"(.260) DRILL
⅜ DRILL
4 BOTTOM RAIL - LEFT MEMBER - 2 REQ.
RIGHT MEMBER - SAME & OPPOSITE
⅜ DRILL - 2 HOLES
5 HANDLE BRACKET - LEFT MEMBER - 2 REQ.
RIGHT MEMBER SAME & OPPOSITE
6 BRACE - 1 REQ.
"G"(.260) DRILL - 2 HOLES
7 HANDLE - 2 REQ.
⅞ DIA. AL. TUBING
"G"(.260) DRILL THRU - 2 HOLES
8 MOUNTING BOARD - 1 REQ.
MAPLE OR BIRCH - 1½ THICK
⅜ DRILL - 4 HOLES

Details of the outboard motor carrier by Geo. N. Duerksen

OUTBOARD MOTOR CARRIER

GEO. N. DUERKSEN
East High School
Wichita, Kans.

It would be interesting to know how many readers of this magazine and teachers of industrial and vocational subjects are ardent fishermen. Oh yes, we like to row but a motor gets us to that favorite spot faster and easier. The lake or river is accessible by a path through the woods, so it is necessary to carry the motor. That chore is something if the distance to the landing is more than a hundred or so yards.

The details of the carrier presented herewith are the result of an assignment in design directed at a senior drafting student. The assignment specified that the carrier was to be: (1) light, (2) collapsible, (3) designed so that the center of gravity be on the wheels and not at the handles, as is the case with most carriers on the market. After checking various carriers, the student came up with the idea that culminated in the project that you see here. All of the framework is aluminum except the axle, clamp board, and the grips. The wheels are a purchase item equipped with solid rubber tires and brass sleeve bearings. These should perhaps be purchased first as the axle size will be dependent upon the inside diameter of the wheel bearings. To collapse the carrier, two wing nuts need to be removed, support No. 3 laid down beside rail No. 4 which allows handle bracket to be put in alternate position as shown. Of course, the frame cannot be collapsed when the motor is fastened to the mounting board. It is removed when in transit.

Phantom lines show how the motor is mounted on the board. The position of the board on the handle bracket is so that the load is directly over the support resting on the axle.

The carrier presents an easy way to transport the motor to and from the boat landing but it also serves well as a stand when storing it. When collapsed the entire carrier takes up a minimum amount of space in the trunk of your automobile.

One of them has found its way to one of the summer youth camps in the northern woods and lake country where it is serving its purpose well.

The outboard motor carrier in use

BILL OF MATERIALS

Part No.	*No. Req'd.*	*Name*	*Material*	*Size*
1	1	Axle	C.R.S.	
2	1	Axle brace	Aluminum	3/16 x 7/8 x 1 1/2 x 14
3	2	Support	Aluminum	3/16 x 7/8 x 1 1/2 x 22
4	2	Bottom rail	Aluminum	3/16 x 7/8 x 1 1/2 x 25
5	2	Handle bracket	Aluminum	3/16 x 7/8 x 1 1/2 x 40
6	1	Brace	Aluminum	3/16 x 7/8 x 1 1/2 x 15
7	2	Handle	Aluminum tube	7/8 O.D. x 20
8	1	Mounting board	Maple	1 1/2 x 6 x 15
9	2	Wheels		10 x 1 3/4
10	1	Bolt		1/4 x 1
11	2	Bolt		1/4 x 1/2
12	2	Bolt		1/4 x 1
13	2	Wing nut		1/4 x 1
14	2	Bolt		5/16 x 1/2
15	4	Bolt		1/4 x 1 1/2
16	4	Bolt		5/16 x 2
17	2	Grips	Rubber	5/16 x 2

BUDGET REQUEST CARD

MARCUS E. ERICKSON
Woodworking Instructor
DAVID C. NIELSON
Head, Trades and Industry
High School
Modesto, Calif.

If a survey be made, it might be discovered that there are as many systems for setting up the mechanics of the annual budget as there are schools. After trying several systems over a period of years the *budget request card* illustrated herewith was developed by our department head and has proved most practical.

When school opens in September, each instructor is given a generous supply of blank budget cards. As the school year runs along he is frequently confronted with items that ought to go in the March budget for the next year. These items are immediately recorded on the budget card as they come to mind. Only one item is entered on a card. If a specific brand is desired that is indicated by *no substitution*. When the budget is due, accumulated cards are added to any others necessary to complete the total items requested. This will include all items necessary for *instruction, replacement, repair,* and *capital outlay* as indicated in the upper left corner. Prices are determined by using current catalogs, phoning venders, using lists provided by the school district, or by leaving the cards with the desired vender for quoting and recording estimates.

Budget cards are then filed with the department head who makes totals for each shop. When these totals require adjustment to comply with funds available the card system facilitates such handling. Further individual cards can be changed or discarded; new cards can be added; they can be filed according to departments or usage. For buying purposes all cards for the same item can be grouped from the various shops to allow quantity buying. If an item is not allowed that card can easily be filed for inclusion in a future budget.

After the supplies have been ordered cards for all shops in the same school can be alphabetized. When an item is received it can be quickly located in the alphabetical file and routed to the right shop as indicated in the upper right corner of the card.

FIRST SHEET-METAL EXPERIENCES

IRA H. JOHNSON
State Teachers College
Mankato, Minn.

If you subscribe to the axiom "the first impression is a lasting one" you will be interested in this method of *selling* the first sheet-metal experience to the junior high student.

An *action* project started and completed within the first class period appeals to a seventh-grade boy. A project with very little expense and including several fundamental operations appeals to the instructor. The students leave with the idea that "this is going to be fun" and the instructor realizes that with proper guidance this is going to be a good group.

What project lends itself to such a desirable situation? I have used two — one the first day the class meets and the other the second day. The first is a *turbine windmill* which is

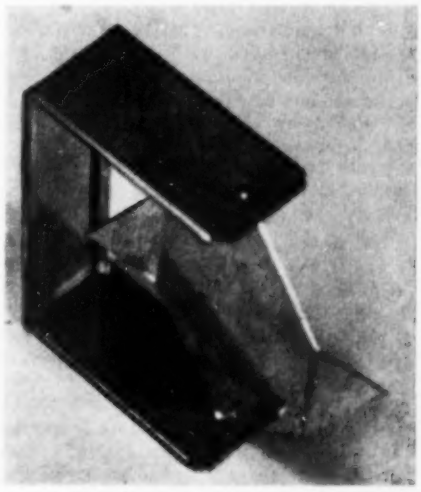
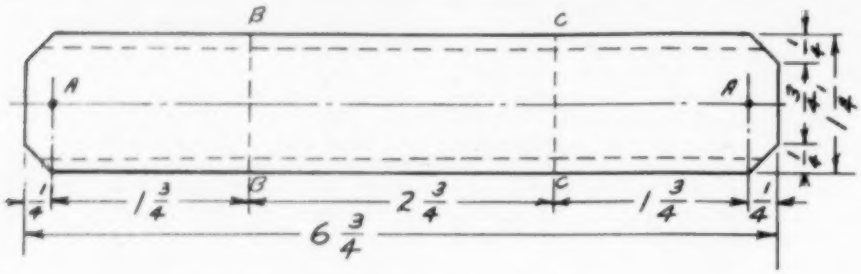
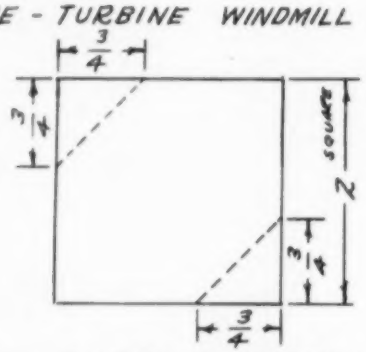


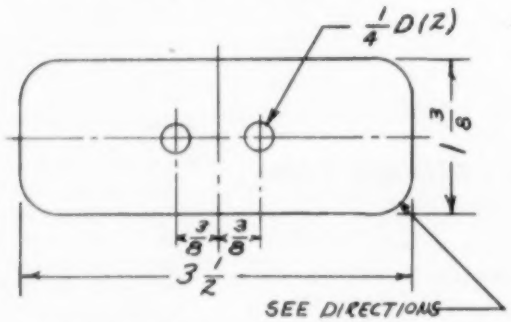
Fig. 2. Turbine windmill



FRAME - TURBINE WINDMILL



ROTOR - TURBINE WINDMILL



WHISTLE

Fig. 1. Details of windmill and whistle

pictured in Figures 1 and 2. The second is the whistle shown in Figures 1 and 3.

Both of these projects may seem trivial but careful investigation will indicate just how many sheet-metal operations will have been performed and how much fun the junior high boy has shown to indicate his interest and boost your own enthusiasm.

Procedure

Frame — Turbine Windmill

1. Cut a piece of tin plate 1¼ by 6¾ in. See Figure 1.
2. Measure ¼ in. each direction from *each* corner and scribe the diagonal lines.
3. Cut the corners on the diagonals.
4. Fold a ⅛-in. hem on both long edges (note hidden lines in drawing).
5. Center punch *lightly* at A.
6. Fold to right angles over a stake at BB and CC (hems inside).

Rotor — Turbine Windmill

1. Cut a piece of tin plate 2 in. square.

Fig. 3. Whistle

2. Measure ¾ in. each way from *one* corner and scribe the diagonal.
3. Turn the piece over and repeat the previous operation on the corner diagonally opposite to the one previously marked.
4. Bend each marked corner (opposite directions) over a stake to about a 30-degree angle.
5. Assemble.

Whistle

1. Cut a piece of tin plate 1⅜ x 3½ in.
2. Scribe around a penny, nickel, or dime at each corner.
3. Cut the corners and remove the burrs.
4. Scribe a line in the center lengthwise.
5. Find the center of this line and scribe a line across the piece.
6. Measure out from the center ⅜ in. both ways on the line scribed lengthwise.
7. Punch two ¼-in. holes as indicated.
8. Fold over a stake on the line drawn crosswise until the ends almost touch.

MAGAZINE TABLE

THEODORE F. TESCHKE
Industrial Arts Instructor
High School
Peshtigo, Wis.

The magazine table pictured is a very excellent project for the student of advanced woodworking. It demands very accurate and skillful work, as only glue is used in its assembly.

The project adapts itself readily to any of the furniture woods or combination of woods. The table pictured combined birch with walnut, and created a striking and attractive contrast.

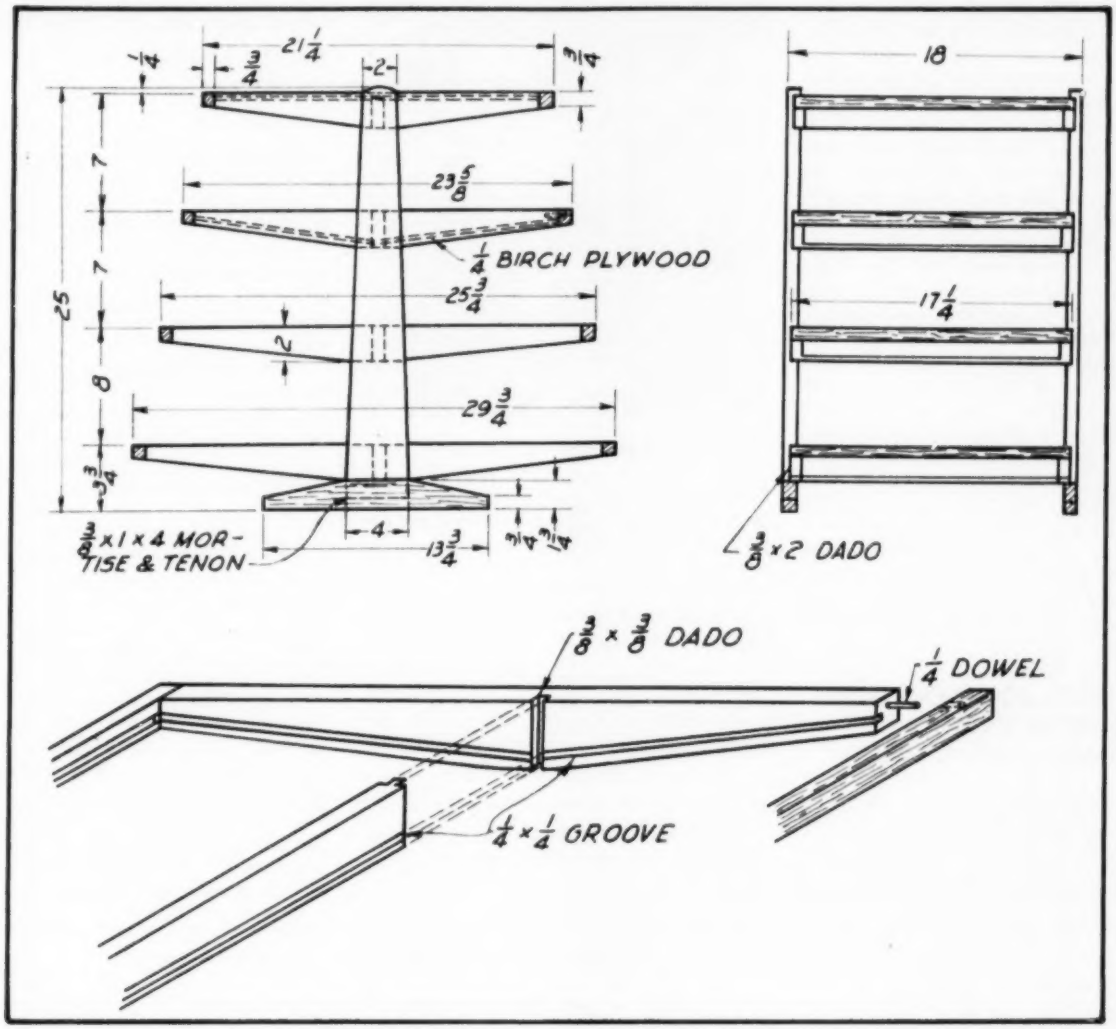
The table incorporates in its construction many of the machine operations and joints such as: dowel joints, mortise-and-tenon joints, dado joints, cutting tapers, and plowing grooves.

BILL OF MATERIALS

No. of Pieces	*Name of Part*	*Material*	*Size*
2	1st sides	Birch	¾ x 2 x 19¾ in.
2	2nd sides	Birch	¾ x 2 x 22⅛ in.
2	3rd sides	Birch	¾ x 2 x 24¼ in.
2	4th sides	Birch	¾ x 2 x 28¼ in.
2	Feet	Walnut	¾ x 1¾ x 13¾ in.
8	Shelf ends	Walnut	¾ x ¾ x 18 in.
2	Legs	Birch	¾ x 4 x 23¾ in.
3	Stretchers 2, 3, and 4	Birch	¾ x 2 x 17¼ in.
1	Top stretcher	Birch	¾ x 1½ x 17¼ in.
1	Top shelf	Birch plywood	¼ x 17 x 20¼ in.
2	2nd shelves	Birch plywood	¼ x 17 x 11¼ in.
2	3rd shelves	Birch plywood	¼ x 17 x 12¾ in.
2	4th shelves	Birch plywood	¼ x 17 x 14½ in.
16	Dowels	Birch	¼ x 1¼ in.

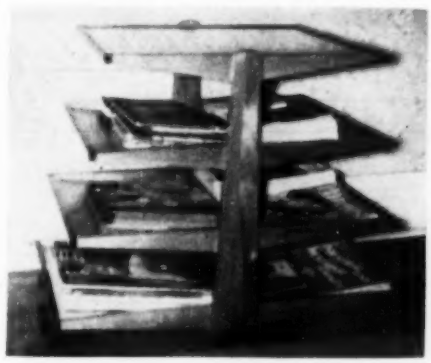
Procedure

1. Get out stock.
2. Square stock.
3. Cut stock to size.
4. Cut tapers on side pieces with jointer.
5. Cut tapers on leg pieces with jointer.
6. Cut tapers on feet with jointer.
7. Cut tenons with table saw and dado attachment.
8. Cut plowed grooves with table saw and dado attachment.



Detailed drawing of the magazine table

9. Cut dados with table saw and dado attachment.
10. Drill mortises with drill press and mortising attachment.
11. Drill dowel holes with drill press and dowel jig.
12. Sand all parts.
13. Glue up legs and feet.
14. Glue up leg assemblies and sides.
15. Glue up leg assemblies and stretchers.
16. Glue up and insert sheives.
17. Glue on shelf ends with dowels.
18. Sand with 3/0 sandpaper.
19. Raise grain with water.
20. Finish sand with 3/0 sandpaper.
21. Apply first coat of varnish.
22. Sand with 240 aloxite paper.
23. Apply second coat of varnish.
24. Sand with 240 aloxite paper.
25. Apply third coat of varnish.
26. Sand with 400 aloxite.
27. Rub down with rottenstone and rubbing oil (gloss finish); rub down with 400 aloxite paper and rubbing oil (satin finish).
28. Wax.



The magazine table in use

The United States has 76 per cent of the world's 53 million passenger cars, and 51 per cent of the world's 17 million trucks and buses. — *Petroleum Newsnotes*, American Petroleum Institute, New York City.

DRAFTING TIPS

LEWIS MALLOW, JR.
High School
Wabeno, Wis.

If you are using either the green or cream colored drawing paper in your drafting classes, your students no doubt have had this experience. First, assume that the drawing boards are covered with a backing material — in this case big sheets of drawing paper — to absorb pencil impressions. The drawing paper is then placed on this backing sheet and fastened with regular drafting tape. At the completion of the drawing the tape is turned back and the plate removed. When this is done, the tape pulls off some of the backing sheet leaving that part of it very rough and fuzzy. When the procedure is repeated a number of times, it is not long and the backing sheet must be replaced. This becomes an additional expense. One of my students solved the problem by using the following method.

Because the same size paper was being used in class for all drawings and was always located in the same position on the board, clear scotch tape strips were first fastened to the backing sheet at the position that the corners of the drawing paper would be when placed on the backing paper. The drawing paper was then taped to the scotch tape instead of directly to the backing sheet. When the plate was removed after its completion, it was a simple matter to remove the drafting tape strips from the back surface of the scotch tape thus avoiding contact with the backing paper. Using this method greatly reduced the number of sheets used as backing paper.

Another suggestion that came from the same student was that of reducing the amount of drafting tape used by making the cuts differently. The usual procedure in preparing a strip of tape is to unroll the length desired and cut at that point. This student suggested unrolling the tape as before but instead of cutting the length in the manner just mentioned, cut a ⅛-in. strip so that the width of the roll now becomes the length of the strip cut. Where four inches of tape served only one drawing, eight drawings can be served by cutting the ⅛-in. strip.

JAPANESE TOY POP GUN

CAPT. ROBERT W. INNIS
Assistant Professor of Air Science and Tactics
Michigan State College
East Lansing, Mich.

One souvenir which many servicemen send home to their families is the popular Japanese Toy Pop Gun. The guns in varying sizes can be found on sale in nearly all Japanese toy shops. They are made of hardwood and are decorated with many combinations of bright colored paints. Simplicity of construction and ease of operation make the gun an excellent gift for the 4–6 year old in the family.

The Japanese toy pop gun

Optometry is the only profession specifically licensed in all 48 states and the District of Columbia to practice vision care, and there is one optometrist in the United States for each 10,000 persons, according to the American Optometric Association.

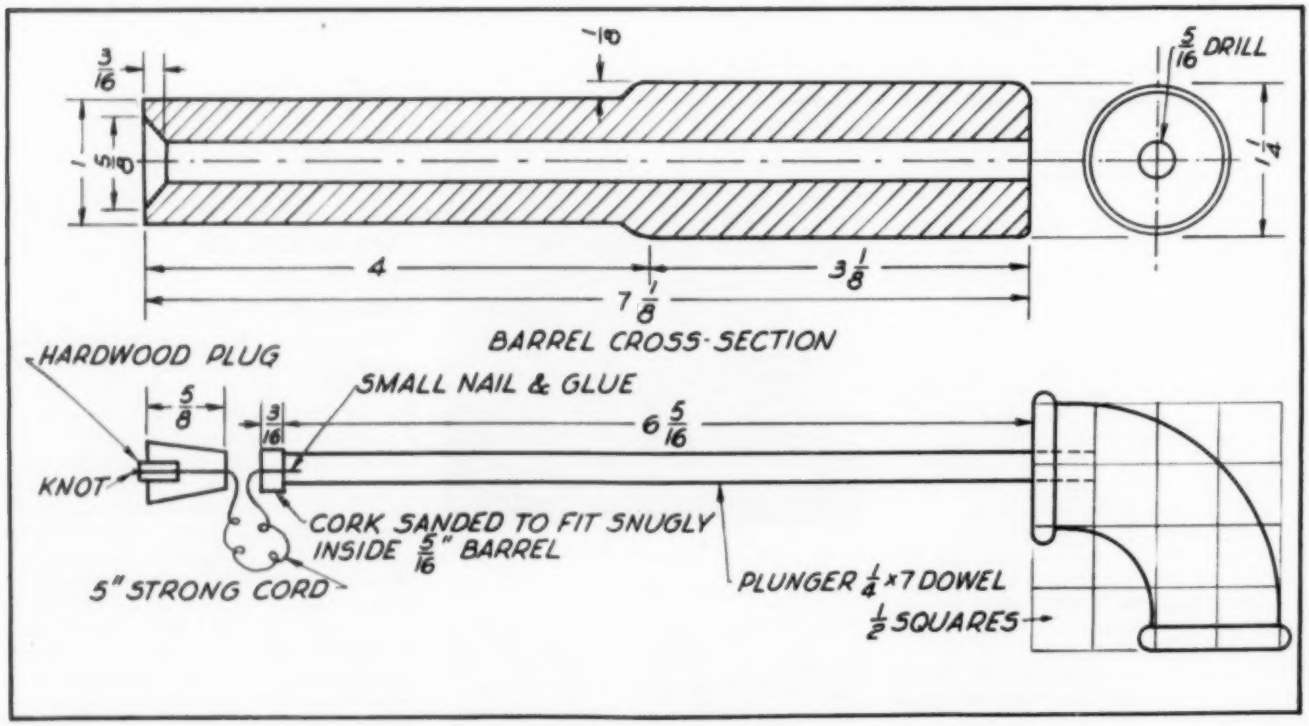
UNIQUE AC-DC VOLTMETER

WALTER R. WESTPHAL
Student, College for Teachers
Buffalo, N. Y.

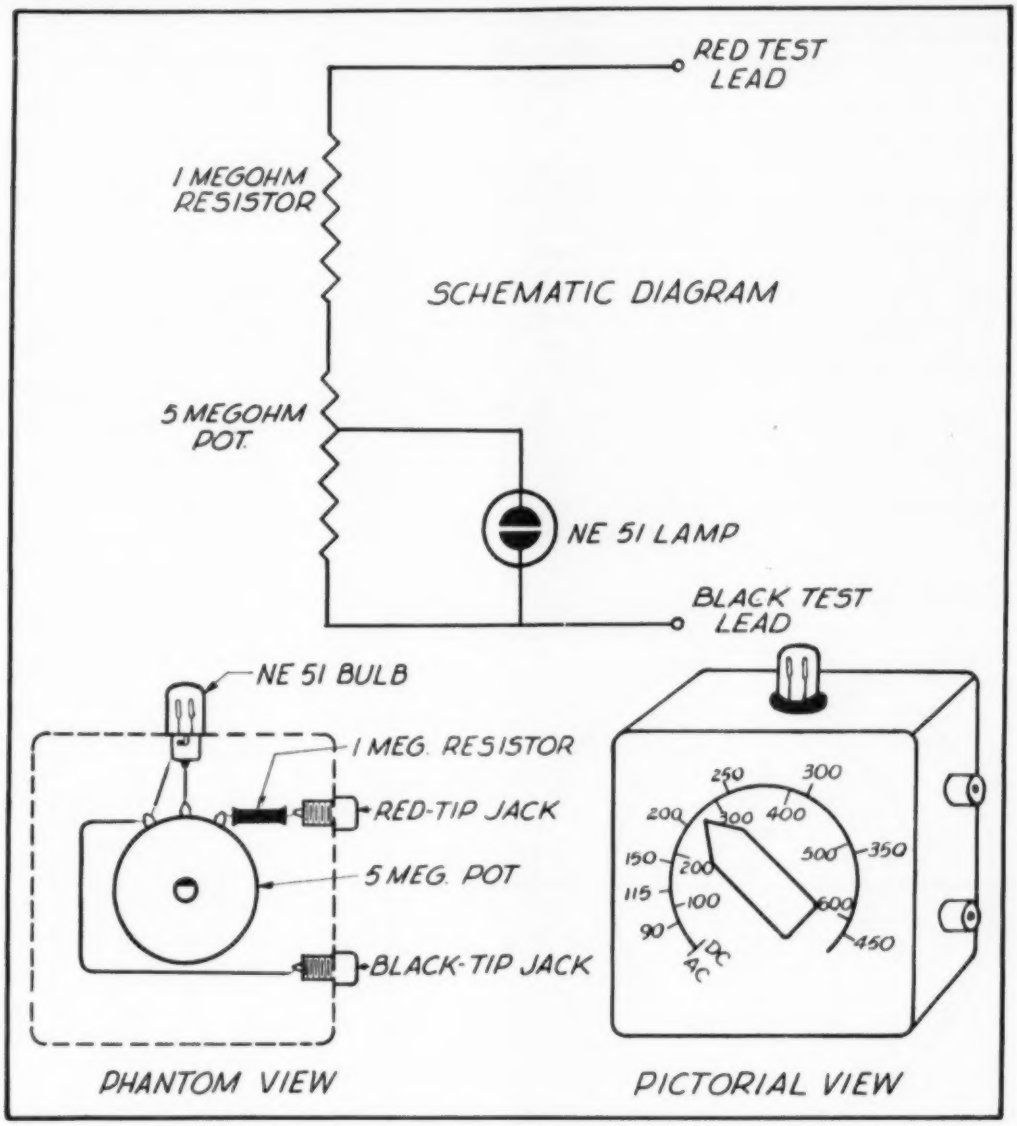
Here is an a.c.-d.c. voltmeter which can be constructed for less than one dollar, yet is accurate enough for all school shop purposes. It utilizes two well-known electrical principles: voltage dividing action by which the potentiometer places only a part of the total voltage across the neon lamp and the fact that all neon lamps have a critical extinguishing voltage.

The range of this instrument is from approximately 85 to 550 volts on both a.c. and d.c., depending upon the characteristics of the particular neon lamp. Another feature is its ability to differentiate between a.c. and d.c. thus determining whether an unknown voltage is a.c. or d.c. If both electrodes glow, the voltage is a.c.; if only one electrode glows it is d.c. The positive terminal, then, is the one connected to the glowing electrode.

After completion, known voltages are needed for calibration of the voltmeter. Turn the potentiometer knob fully counterclockwise and connect the test leads to the a.c. line voltage. Now turn the knob until the lamp glows. Turn the knob in the opposite direction until the lamp just goes out and mark this spot on the dial (normal line voltage is approximately 115 volts). In the same manner place the test leads across other known voltages to calibrate the dial. A different scale must be used for a.c. and d.c. as the lamp does not respond equally to these two voltages.



Japanese toy pop gun



Detailed drawing of the unique a.c.-d.c. voltmeter by Walter R. Westphal

This instrument will hold its calibration indefinitely; places only a small current drain on the voltage source; and is practically burnout proof. It is inexpensive enough to be a good junior or senior high school project which is useful in many ways. The next time you are looking for a project in electricity, give this one a try.

FILING CABINET FOR WORKING DRAWINGS

LEWIS MALLOW, JR.
High School
Wabeno, Wis.

"I left my bill of material in my locker." "May I go back to the assembly to get the working drawing of my end table?" "John, may I borrow some paper from you, I left my notebook in the assembly." These are statements heard by shop teachers over and over again.

Filing cabinet for drawings

A very practical way to overcome this problem is to use a filing cabinet for working drawings in the shop.

The illustration shows such a filing cabinet. It is used for storing drawings, notebooks, etc. Originally this cabinet was a three section bookcase. The glass doors are a nice feature because they facilitate easy and rapid inspection of papers.

To convert the bookcase into a filing cabinet, the wooden shelves were replaced with masonite shelves. This was done by nailing ½ by ½ by 9-in. wood strips spaced 2 in. apart, each side of the two outside sections. The masonite shelves were then cut to conform to the dimensions of the cabinet section and slid onto the strips. They were not nailed to the strips, however. In the event that a higher shelf space is needed, one shelf may be removed, allowing a double shelf space. The

center section shelves accommodate books, cross section drawing paper, and bills of material. The upper two shelves were reserved for shop textbooks; the next two were used for drawing paper and bills of material for student use. The bottom of the center section was used for pamphlets and bulletins distributed by industry.

Each student is assigned a shelf to store any shop papers. To avoid the confusion caused by students getting their shelves mixed, each shelf is numbered. This number corresponds to the student roll call number. Some of the advantages of such a plans cabinet are as follows:

1. All students have a convenient place to store shop papers.
2. Students are never forgetting to bring shop papers to class; they are already there.
3. Students are exposed to a system of orderliness.
4. It adds a "professional" appearance to the shop.

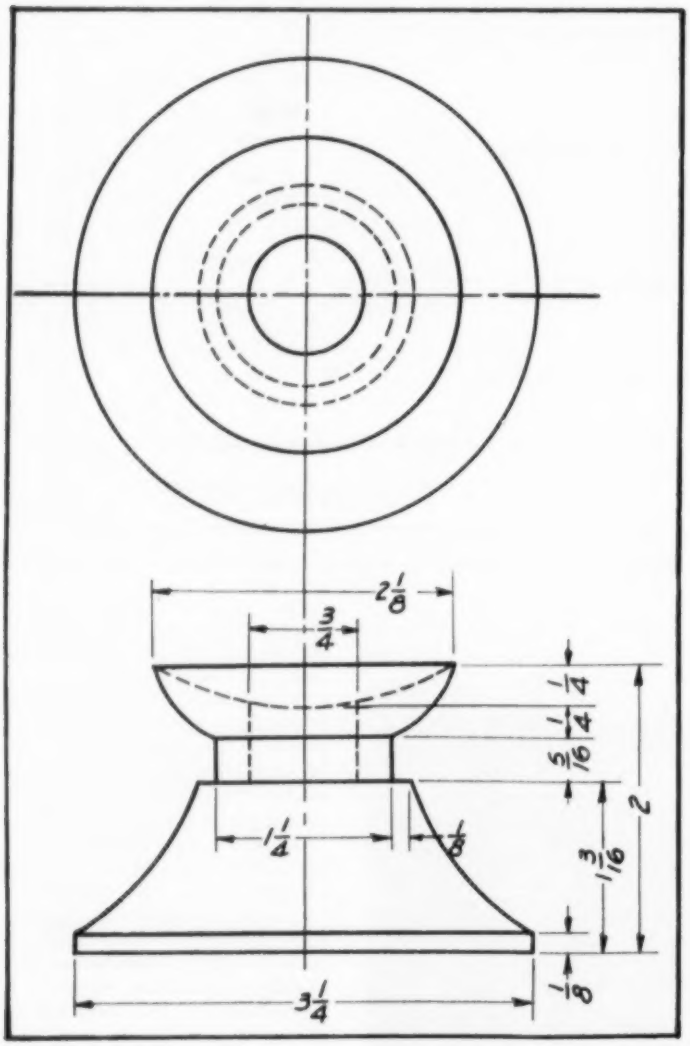
CANDLESTICK

JAMES H. CONACHER
Archbishop Lenison's Grammar School
London
and
Nichols Junior High School
Mount Vernon, N. Y.

Shop students are usually eager to try their skill at lathe turning, and to enable each to satisfy his interest, the project to be made, when time is limited, needs to be simple but useful. The turned candle base is such a project. It can be produced quickly, gives the student great delight to take home, and is a good exercise in the fundamentals of faceplate turning.

From a block of close grained hardwood (the illustrated project is in walnut) 3½ in. square by 2⅛ in. thick, cut a cylindrical block 3⅜ in. in diameter with band saw, or an octagonal block to give a 3⅜-in. diameter with the backsaw. Mount the piece on a faceplate, and turn it to the diameter of the base with a gouge. Use the parting tool for the short stem, a skew chisel for the outside curves, and a scraper tool for the inside curves. Finish with several grades of sandpaper. The illustrated project was oiled with linseed oil and polished with carnauba wax to give it a hard lustrous finish.

The candle is a colored five-cent one, but if for decorative purposes only, a wooden candle may be turned to give practice in between center turning. The turned candle may be finished with enamel, and a short piece of string may be inserted for the wick.



Detailed drawing of the candlestick base

LET'S CONSTRUCT A FLANNEL BOARD

O. S. HARRISON
Chairman, Industrial-Arts Department
University of Georgia
Athens, Ga.

Education is a co-operative undertaking. It is difficult to justify any single subject in the curriculum in terms of its specific contribution, but any subject is justifiable in proportion to its contribution to the total education of the pupils. Thus, teachers and pupils and administrators should work closely together.

Every experienced industrial-arts teacher is well aware of the many and oftentimes useless requests sent to the shop. He has requests to sand and refinish school desks and furniture; construct small articles; repair doors, windows, desks; open cabinets that have become stuck; install pencil sharpeners; build walks; build and repair bleachers, etc.

Some of the requests should not be accepted by the industrial-arts teacher because much of the work calls for just plain drudgery and of such a nature that there is little or no learning, and practically no contribution to the aims of the industrial-arts program.

A good administrator, and an informed faculty will not call upon an industrial-arts department for help unless there is a definite need for it and it fits in with the objectives of the department and the school.

This does not mean the industrial-arts teacher and his pupils should not aid other areas of study — far from it. But it does mean that the test should always be applied: Does the request aid in learning and is it worthy of the time and cost which will be expended in accomplishing it?

The flannel board is an excellent project which will enhance the teaching and learning of the entire school. Its principle and construction are simple. Lightweight objects or cutouts from paper or cardboard will adhere to the flannel or felt which has been tightly stretched over a board. These cutouts will not fall away and may be moved about with ease. They can be used over and over again. No tape or thumbtacks are necessary. The pupils as well as the teacher will enjoy using the board. They will find many new uses for it.

And what are some of the uses? In the elementary grades — number combinations — grammar drills — word drills — spelling —

product maps — location of rivers, states, towns, on maps — illustrate stories — sentence structure — weather maps, etc. And in the secondary schools — mathematical formulas — safety areas suggestions — planning new programs or changing old ones in the shop, home economics, or agriculture department — charts and graphs and diagrams — athletic plays and diagrams — organization of committees, etc.

Construction of the Flannel Board

The construction is simple so no elaborate instructions or drawings are needed.

1. Any solid material can be used such as masonite, upson board, beaver board, or plywood. A plain flannel board may be improvised quickly by using a mechanical drawing board.
2. Choose a size suitable for its use. Don't make it too small because there are many uses for it. Suggested sizes range from 24 by 36 in. to 36 by 48 in.
3. Felt or cotton flannel is stretched tightly over the front of the book and tacked or stapled to the back.
4. Design and construct a rigid frame similar to a picture frame and place the flannel board in it same as you would place glass in a regular picture frame.
5. In order to improve the appearance, the frame should be finished with enamel or varnish or other suitable finish. Choose some bright colored flannel.
6. The frame may be supported on an easel or on the chalk rail under the regular blackboard. (Portable easels may be designed and constructed in the shop.)

There seems to be no limit to the materials which can be used on the flannel board. Even small objects will stick to it if they are flat on one side and are backed with No. 1½ sandpaper. Figures and diagrams can be cut from paper, cloth, rubber, oilcloth, lightweight floor covering, sandpaper, cork, rubber or regular sponge, small sticks, etc.

Teachers and pupils alike will recognize and appreciate the many opportunities for creating and improvising with the flannel board.

Fig. 2. The bed table in use

BED TABLE

ARNOLD VISPI
Shop Instructor
A. D. Johnston High School
Bessemer, Mich.

Recently our County Convalescent Home requested our school shop to make a number of bed tables for them.

The boys in the shop classes, when told about the project, were very enthusiastic and were willing to lay aside their own school shop work to co-operate. A drawing of the proposed table was then made after its design had been discussed.

Later reports from the county home indicated complete satisfaction.

Figure 1 shows the details of the table, and Figure 2 shows one in use.

The drawing is self-explanatory although I might comment on the fastening of the base

BILL OF MATERIALS

Pcs. Req.	Name	Stock	Size
1	Top	Fir plywood	¼ x 13 x 24 in.
2	Frame under	Pine	¾ x 2 x 11 in.
2	top		¾ x 2 x 22 in.
4	Legs	Pine	¾ x 1 x 7½ in.
2	Base shoe	Pine	½ x 1 x 10½ in.
1			½ x 1 x 21½ in.

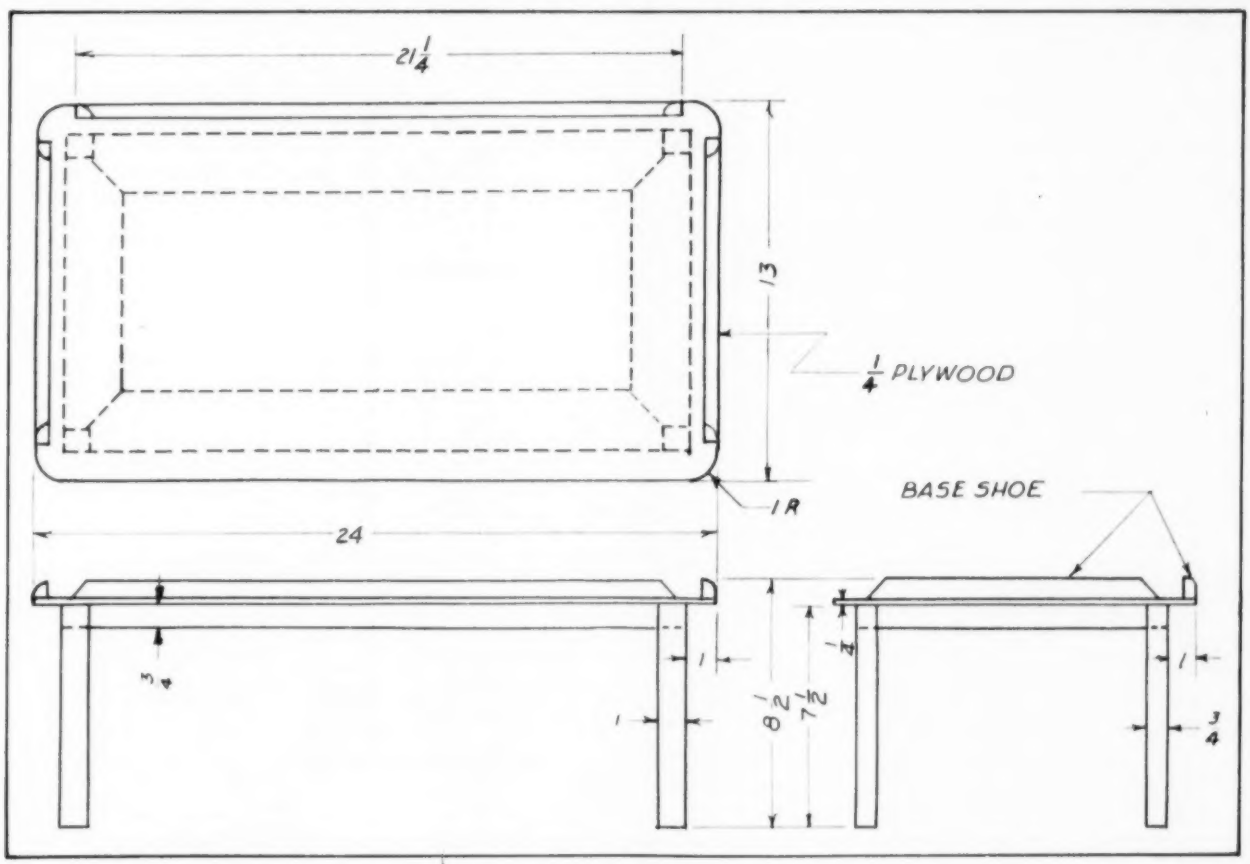


Fig. 1. Details of the bed table

shoe — ⅝-in. flathead screws were used, screwing through the plywood into the base shoe. So that these bed tables could be easily cleaned of crumbs and other food particles note the length of base shoes. Projects were finished with three coats of varnish. The initial coat was thinned out.

MAGAZINE LAMP TABLE

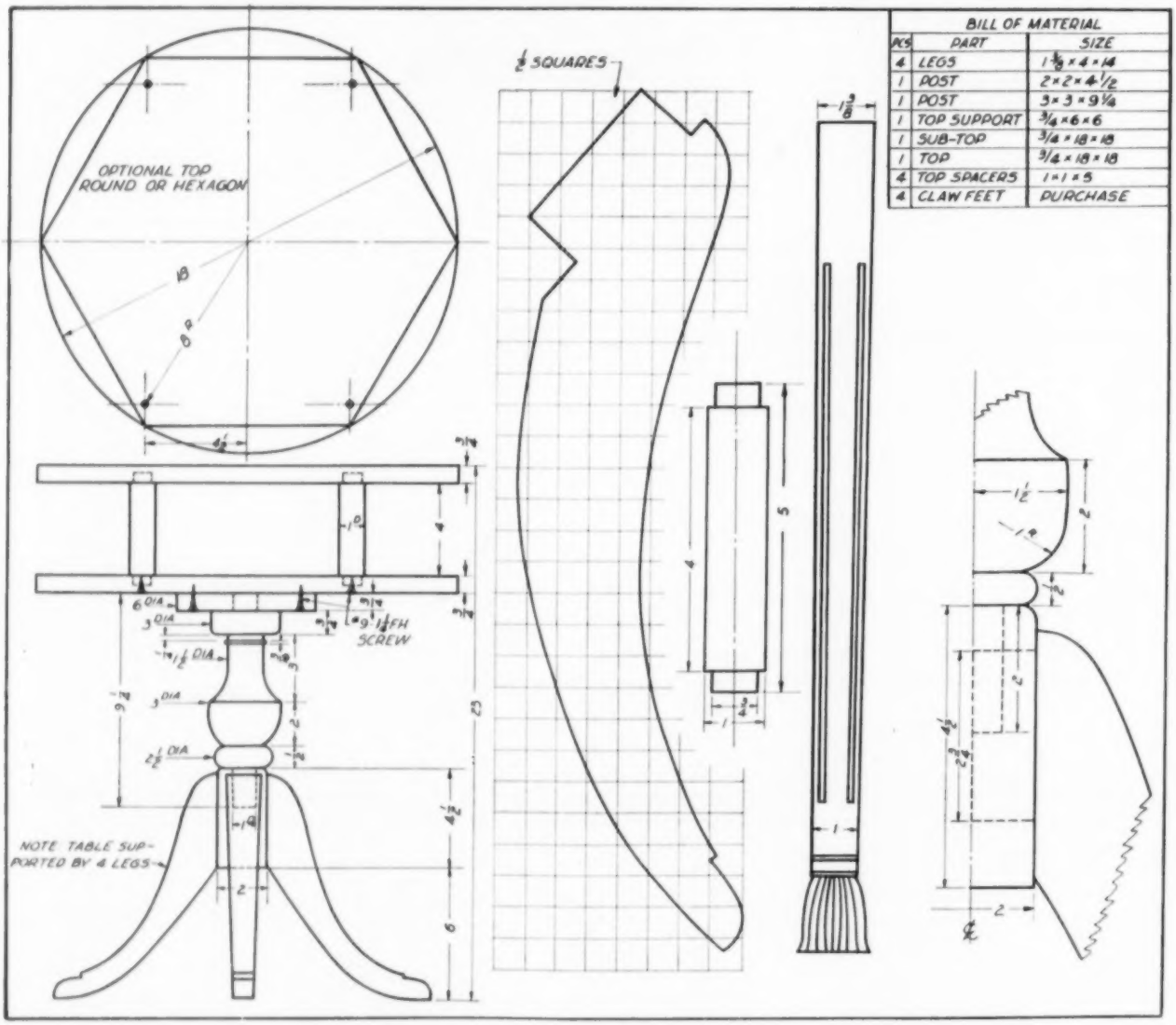
A. H. LEIN
Vocational Education Department
High School
Boone, Iowa

Here is an occasional table that can be constructed cheaply and yet makes a fine piece of furniture for the home. The top may be either round or hexagon in shape, and the table may be constructed of either walnut or mahogany. This table was designed for students in the eleventh or twelfth grade.

Magazine lamp table

Method of Procedure

1. Lay out stock for top and sub-top.
2. Plane, sand, and cut to exact shape and size.
3. Lay out top spacers.
4. Cut stock for lathe and turn to 1-in. diameter. Measure correct length and cut ¾-in. dowels ½ in. long at each end. Then sand with 4/0 sandpaper.
5. Next put the two tops together, and on the bottom side of the sub-top, lay out center of top supports.
6. Drill a ⅛-in. hole through the sub-top and ¼ in. into the bottom side of the top. This will give you a perfect alignment of holes. Also number the holes so you can get the same alignment again.
7. Drill a ¾-in. hole ½ in. deep in the bottom side of the top and the top side of the sub-top, using your ⅛-in. hole as a pilot hole.
8. Then fit the top supports into place and clamp the two tops together.



BILL OF MATERIAL

NO.	PART	SIZE
4	LEGS	1⅝ × 4 × 14
1	POST	2 × 2 × 4½
1	POST	3 × 3 × 9⅛
1	TOP SUPPORT	¾ × 6 × 6
1	SUB-TOP	¾ × 18 × 18
1	TOP	¾ × 18 × 18
4	TOP SPACERS	1 × 1 × 5
4	CLAW FEET	PURCHASE

Details of the magazine lamp table

9. Use a No. 9 by 1¼-in. f.h. screw to hold the sub-top in place, but do not glue it as you will want to disassemble it when you apply your finish. The top, however, should be glued to the supports at this time.

10. Lay out stock for the 4 by 4 by 12-in. post.

11. Lay out the 2 by 2 by 4⅜-in. post and turn one end 2 in. in diameter and 2 in. long. Also lay out the mortises in the piece.

12. Drill a 1-in. hole in the first post and put the two pieces together with glue. Then turn the entire post as one piece, to the exact size and shape.

13. Now, cut the 6 by 6-in. support for the top, and drill a 1-in. hole to fit over the turned leg and glue to the turned post.

14. Lay out the stock for the Duncan Phyfe legs. Plane them to a thickness of 1⅜ in. Try to have the grain of the wood run the long way of the leg. This is for added strength.

15. Cut them out to the correct shape on the band saw.

16. Put design on leg with shaper.

17. Cut and fit claw feet.

18. Glue legs to main post.

19. Fasten top to the post and fasten with 4 No. 9 by 1½ f.h.s.

20. Finish with walnut oil stain, and two coats of shellac. Rub each coat with steel wool.

21. Then apply two coats of lacquer and rub with 3/0 steel wool.

22. A third coat of shellac may be applied. This should be rubbed with DuPont No. 2 rubbing compound.

In many instances, oil-powered diesel locomotives have produced annual savings of 20 to 30 per cent on their initial cost, making them one of the best possible capital investments. — *Petroleum Newsnotes.*

PLASTIC MONOGRAM LETTER HOLDER

CHRIS H. GRONEMAN
Industrial Education Department
The A. & M. College of Texas
College Station, Tex.

The monogram letter holder described in this article may be made of Plexiglas or Lucite.

To make the monogram, it is necessary to plan the letters with the type of alphabet where the parts will stay intact. For this block style lettering is very suitable.

After the holder is constructed it may be dyed or tinted any desired shade to match or contrast with the color scheme of the room or the other desk accessories. Another idea would be to tint the monogram and leave the base crystal-clear, or vice versa. Part of the reward for working with such projects is the possibility of using one's own ideas in original execution of design and color.

BILL OF MATERIAL

Quantity	*Name*	*Material*	*Size*
1	Base	Plastic	¼ x 2 x 4
1	Back	Plastic	¼ x 1¾ x 2¼
2	Fronts	Plastic	¼ x 1¼ x 1½
		Plastic cement	
		Plastic dye	

Procedure

1. Lay out all the parts on Plexiglas or Lucite.
2. Cut the parts with a coping or jig saw.
3. File the edges.
4. Sand the edges. It is not advisable to buff the edges of the letters. A frosted effect will be more attractive.
5. Place the letter on the base and apply cement.
6. Tint if desired.
7. Apply a high grade of wax and polish with a soft cloth.

TOOL STORAGE

MERLE TRAIL
Chairman, Shop Department
Wilson Junior High School
Glendale, Calif.

Good tool arrangement is a vital factor in any school shop.

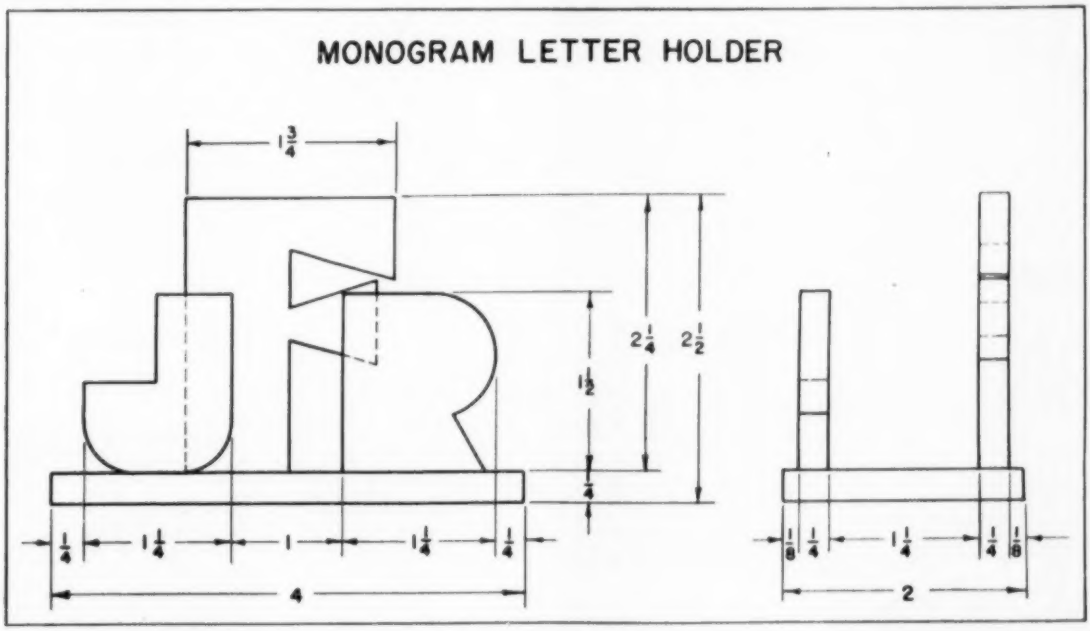
For tools used in industrial arts, mountings made from metal or other special material are excellent, but those made of hardwood are usually adequate. Also, they are easily replaced and expanded if additional tools justify revision on the size and number of the mounting.

Figures 1, 2, and 3 show an arrangement of tools in a shallow cabinet or case. Cabinets of this type can be closed and locked whenever it is desirable to do so. It fits into a very limited space, and can house many tools. Since this type of cabinet is usually rather shallow, the tools are very accessible to the small student.

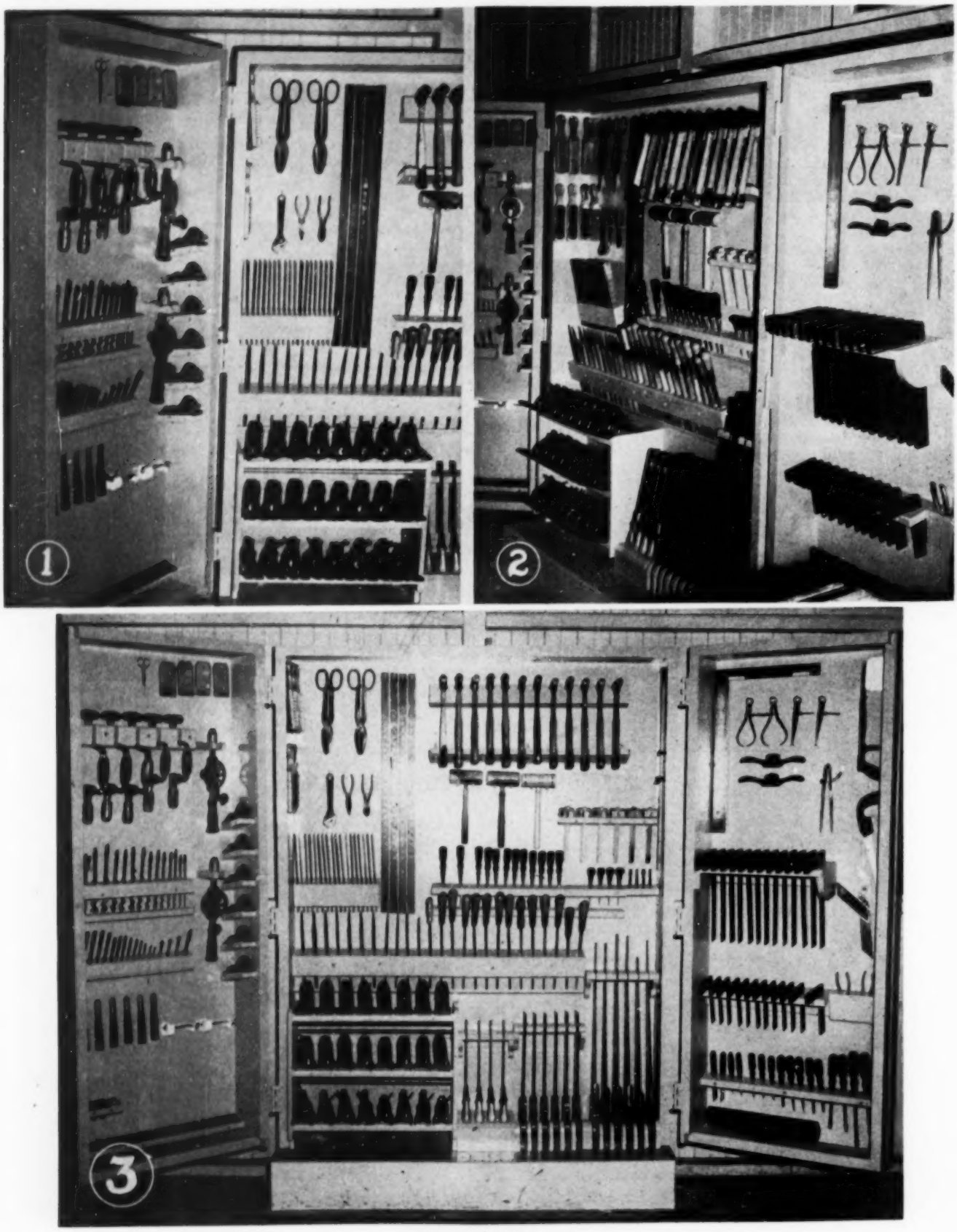
The average height of our seventh-, eighth-, and ninth-grade boys was a factor in placement of certain tools in the cabinet as well as for the maximum height of the cabinet itself. An attempt was made to place the tools that were used oftenest near the lower half of the tool cabinet.

Figure 1 shows how chisels, scribers, etc., are protected so that students have very little opportunity of injuring themselves while removing tools from their holders.

One obvious limitation in some of our holders is that tools such as try squares need to be raised the length of the blade to be removed from the case. However, since they are



Plastic letter holder



Tool cabinets

held at an angle and at a convenient height in the case, we have found that they can be removed by what is nearly a normal movement of hand and arm in picking up a tool.

Figure 2 shows how most of the tool holders were arranged at an angle of approximately 20 degrees. This has two advantages. It allows for a closer grouping of tools vertically in a case, as well as making it more convenient to remove or replace tools in their respective holders. This also helps to avoid the situation where one tool needs to be removed in order to remove another. Tools fit easily into their holders. No twisting or turning is necessary to remove or replace a tool. Also we tried to avoid the use of the "button type" holders. They are probably the least desirable in a junior high shop.

This type of tool case can be made in almost any size, the only limitation being space available for opening the doors. The size, amount, and kind of tools mounted would depend on the situation for which it is to be used.

The inside of this case is extremely easy to keep clean. There are no shelves or holders that have a tendency to *pocket* dirt.

The *tool foreman* will also appreciate it, because he will be able to check the case at the beginning and end of a period in record time, and as an additional help, the outline of each tool may be painted on the back of the case and doors.

COLD GLUEPOT

CLINTON HILLYARD
Howard Roosa School
Evansville, Ind.

This gluepot is one of the best glue dispensers I have used. It is easy to make and the shield around the cup offers a great amount of protection to the cup. Students can handle this cup without fear of breaking it. If it is impossible to clean the cup today, tomorrow it will clean easier. The remains will flake out very easily in one piece.

Purpose

1. It is very easy for students to make as a project. Securing the dimensions for the cup and inserting them on the drawing is a good lesson in itself.
2. This gluepot makes an ideal dispenser.

Materials

1. Tea cup with a round bottom from open stock.
2. Three pieces of 24-gauge sheet tin sized as shown on drawing.

Procedure

1. After securing the cup and placing the required dimensions on the drawing, you are ready to begin.
2. Hem the top rim of the cup before forming the side seam.
3. The bottom can be soldered on from the outside. Then trim the bottom down to $\frac{1}{8}$ in.
4. Form the handle and shape with the hem outward.

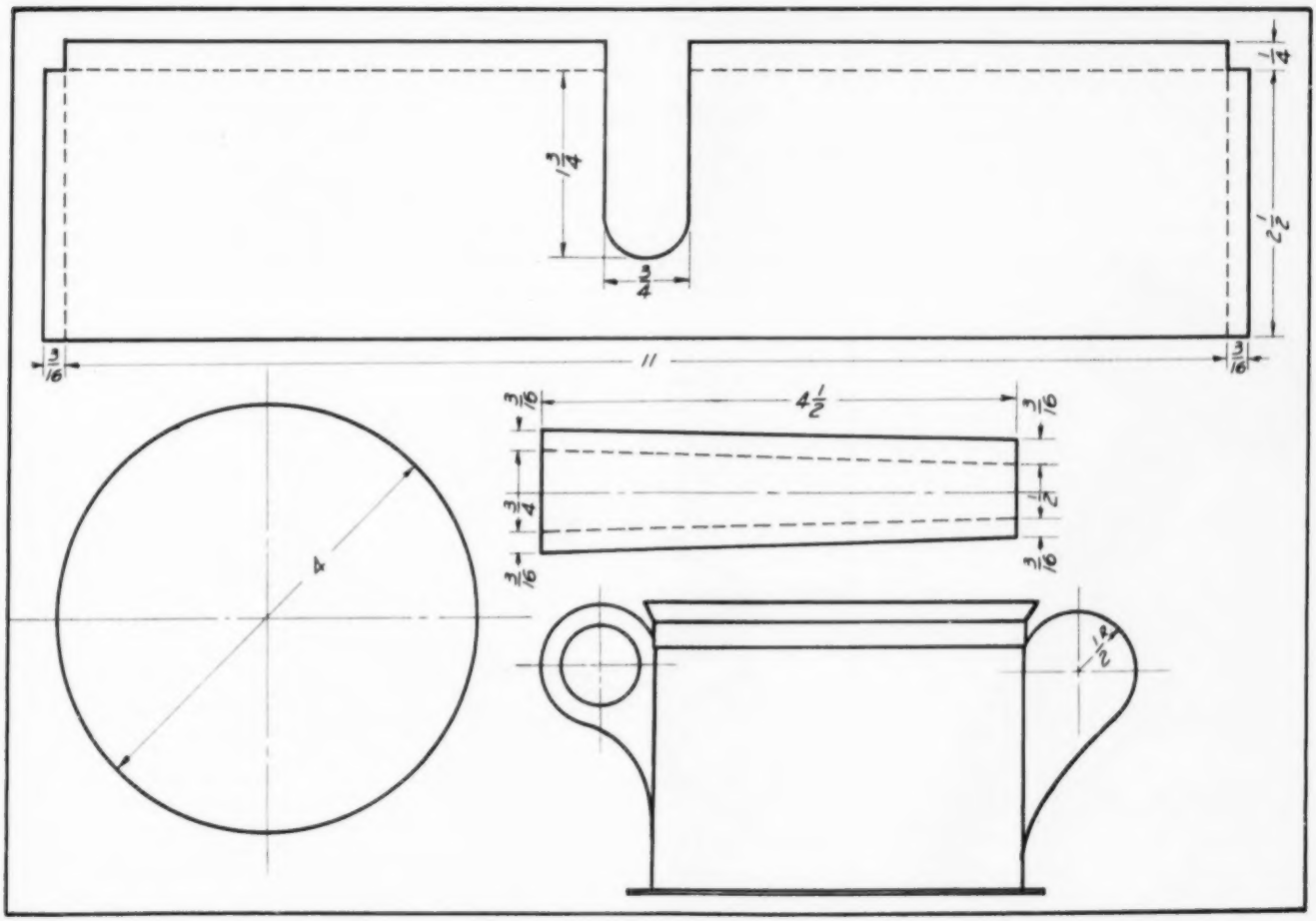
This gluepot will be found very practical.

MALLET HANDLES FROM DISCARDED GOLF CLUBS

ARTHUR C. CORBETT
Stayton, Ore.

Broken golf club handles make ideal mallet handles and can be installed by anyone in a matter of a few minutes. Broken golf clubs can be obtained at most golf clubs for a few cents, or if you are a shop teacher and your school has golf clubs in the athletic department, your supply of broken clubs is assured.

Golf club handles for the most part are made of lightweight steel tubing, the handle being encased in leather, plastic, or hard rubber, all of which makes them ideal mallet handles. After securing your handle — a No. 2



Detailed drawing of the cold gluepot

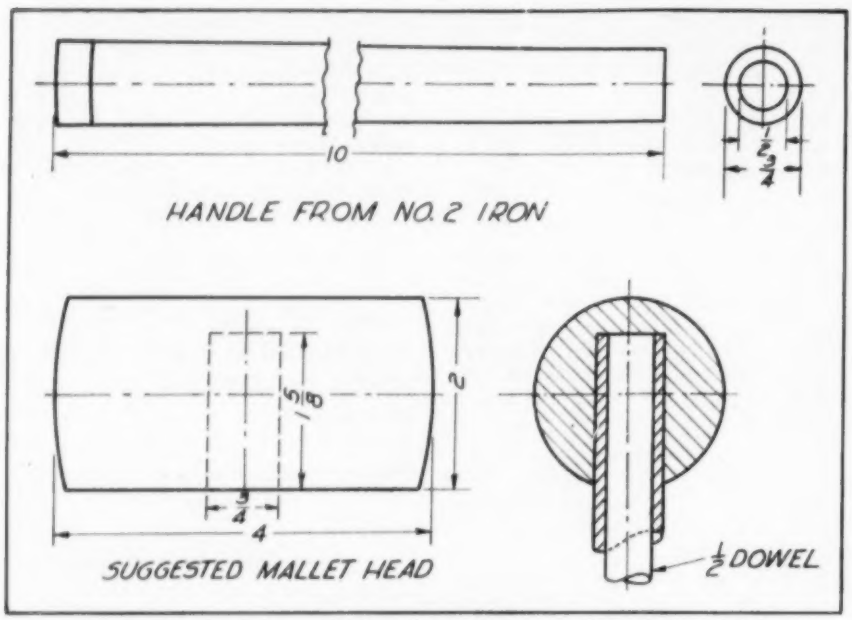


Fig. 1. Details of the mallet handle made from a discarded golf club

iron makes a dandy — cut to approximately 10 inches in length. Measure the cut-off end accurately and drill a hole into the mallet head to the corresponding size. Drill approximately three fourths of the way through. If you do not have a mallet head handy, a convenient size can easily be turned according to the dimensions shown in Figure 1. See diagram for dimensions. For additional weight and strength, a half-inch dowel will fit snugly inside the No. 2 iron.

Assemble with a generous portion of any quick-setting glue.

Fig. 2. Mallet equipped with a golf club handle

CORRECTION

Unfortunately an error appears on the cut of the "Nite Shelf" on page 185.

Please ignore the note "½ sq. for lettering patterns" under item 6. Letters and squares are full size as shown.

PLASTIC LAMP

JOHN A. CAREY
St. Mark's School
Southborough, Mass.

We are always looking for new projects, and the lamp described herewith is a plastics project that will most certainly interest students who have an aesthetic inquisitiveness. The actual construction is quite simple, but the possible variations of design are so numerous as to challenge the most creative individual.

The two principal methods of bonding sheets of plastic together are heat and cement. I found that the system of soaking plastic in the cement worked more easily for my students, and the accidental bubble effect added interest to the design.

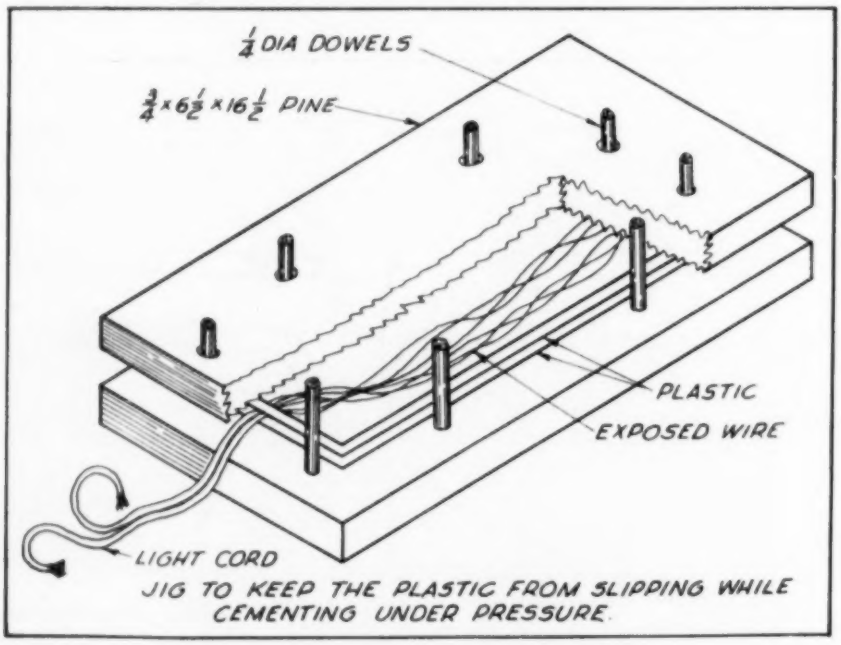
To cement two sheets of plastic together with a piece of copper wire between them, follow the directions given herewith.

Arrange the wires according to the given design upon one piece of the plastic, which is placed in a horizontal clamping jig.

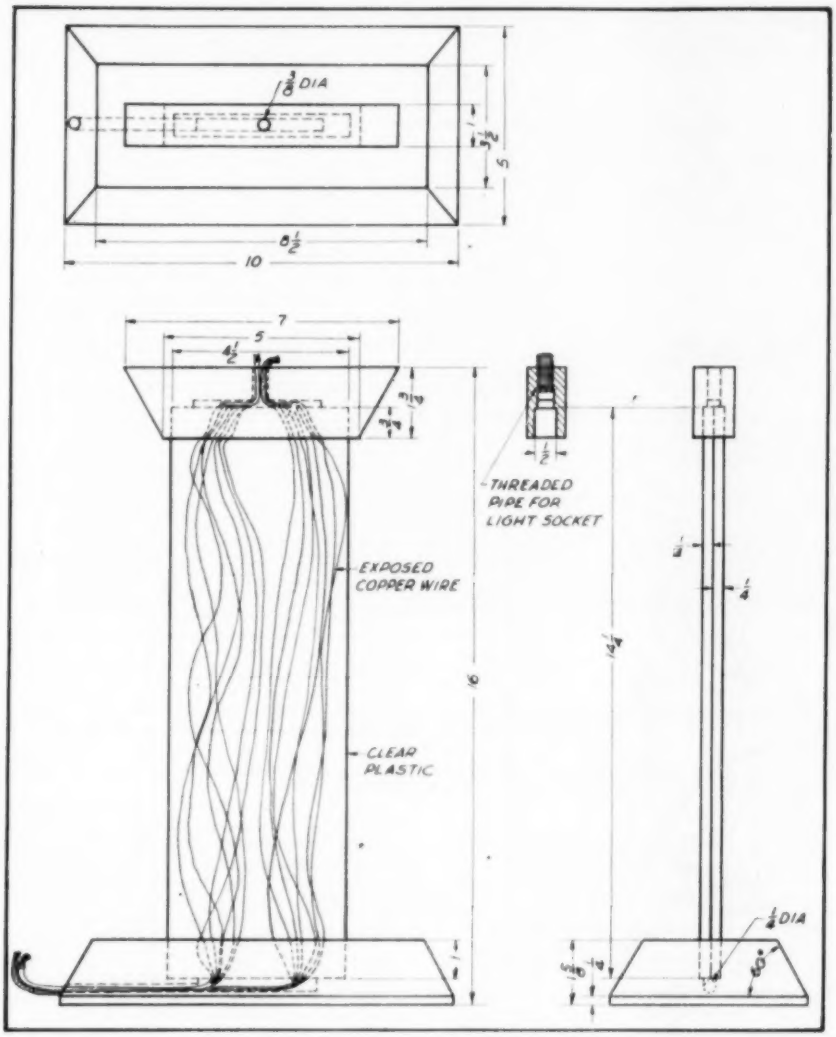
One face of the other piece of plastic is immersed in a pan, or dish of cement, which acts as a solvent. Masking tape can be applied to within ⅛ in. of the face, around the edge, to protect it from the cutting action of the cement. The time required to produce the necessary cushion will vary from 1 to 5 minutes. A deep cushion is desirable, for when the piece is taken from the cement and placed against the wire, and the dry plastic piece it is to join, the wire must be pressed into the soft cushion. The dry face of the piece, with wire on it, swells into the cushion because of the action of the solvent, and forms the joint.

A wait of several days may be necessary for the joint to harden. A plane or jointer will then smooth the edge where the pressure has squeezed out the excess cement.*

*Suggested cement: Ethylene dichloride, and sold by Rohn & Haas, known as Cement 1-A. References: *Working With Plexiglas*, pp. 28–29, Rohn & Haas Company, Washington Square, Philadelphia, Pa., 1947. *General Plastics*, pp. 34–36, McKnight & McKnight, Bloomington, Ill., 1948.


1/4 DIA DOWELS
3/4 x 6 1/2 x 16 1/2 PINE
PLASTIC
EXPOSED WIRE
LIGHT CORD
JIG TO KEEP THE PLASTIC FROM SLIPPING WHILE CEMENTING UNDER PRESSURE.

Jig for cementing the two pieces of plastic



Detailed drawing of the plastic lamp

The problem of a light cord hanging down is solved by using the exposed copper wires of the cord as a decorative motif. The trapping of the wire, and any other materials desired to complement the design is accomplished by using a jig to keep the plastic from slipping while under pressure.

A soaking dish is necessary, for the faces of each lamp side must be placed so as to allow the cohesive cement to soften the surfaces of the plastic, causing the two parts actually to become one piece, when pressed together.

When the desired section of cord is bared of insulation, be sure that the wires from one side do not come in contact with those of the other side, and be careful not to cut any of the small copper strands.

We used feathers, as well as the exposed wires to add interest; but the important thing is to keep the flowing copper wire free enough to give a graceful spiral to the design.

The natural copper of the wire is enhanced by the use of mahogany for the base and top pieces. Both of these must be mortised, for the plastic, and also for the wire as it leaves the plastic to run out into the socket, or plug.

A simple rectangular shade will add the finishing touch to this project, and you may be certain that this lamp base will cause comment for its uniqueness.

A PUZZLING PRACTICE PIECE IN LEATHER

EDWARD R. ROBERTS
Whittier Union High School District
Whittier, Calif.

Scrap — What to do about it? How to get the most for our investment is always a problem for the industrial-arts teacher.

Here is a beginning handicrafts project designed to utilize leather scrap and waste and obtain the most learning experience possible.

The original practice piece was designed to instruct the student in two specific areas. The first is the basket stamping process. How to use the tool in order to obtain the desired design. Second, to teach the student how to edge, punch, and measure a belt before they actually make the real thing.

In the earlier stages of using this project one problem was brought about by a student who had a good question. "What good is this practice piece that I have now finished?"

It was just such a question that made me wonder how to give a good learning project that *interest punch*.

Students of all ages love puzzles. "Why not make this practice piece into a puzzle?" And so it became a puzzling practice piece, which has aroused much interest among students, teachers, and parents.

Construction

Any scrap cowhide or calfskin may be used providing it ranges between ¾ by 10 in., to 2 by 10 in., and may vary from 3/16 to ⅛ in. in thickness.

The steps for completion of the project are as follows:

1. Precut scraps to desired size, 1 by 12 in. preferred.
2. Set wing dividers to ⅛ in. and scribe ⅛-in. border along each side of belt strip.
3. Place basket stamp next to scribe line and stamp, skipping one tool length between each mark, working from left to right. See step 1, Figure 1. Stamp one complete row at a time before you move on to the next. If there isn't room for the full width of the tool in the last row, lean the tool slightly toward you, then stamp.
4. When stamping is completed, edge, crease, and burnish the edges of the belt until smooth.
5. Starting 2 in. back from the tip, lay out 5 holes 1 in. apart and punch. See Figure 2. To check the students in measuring accurately, have them lay out the belt for a 7-in. waist measurement.

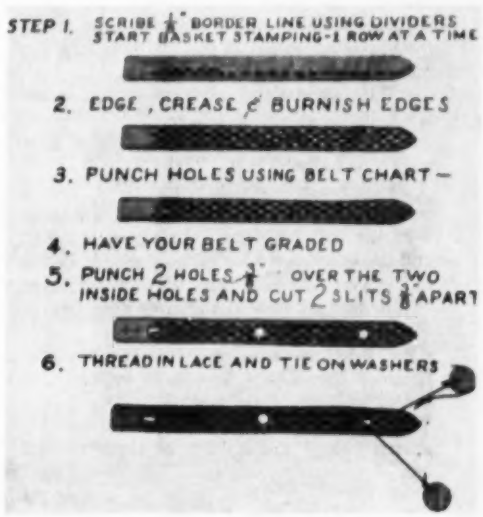

STEP 1. SCRIBE ⅛" BORDER LINE USING DIVIDERS START BASKET STAMPING-1 ROW AT A TIME
2. EDGE, CREASE & BURNISH EDGES
3. PUNCH HOLES USING BELT CHART –
4. HAVE YOUR BELT GRADED
5. PUNCH 2 HOLES ¾" OVER THE TWO INSIDE HOLES AND CUT 2 SLITS ⅜" APART
6. THREAD IN LACE AND TIE ON WASHERS

Fig. 1. Steps in making the puzzling practice piece

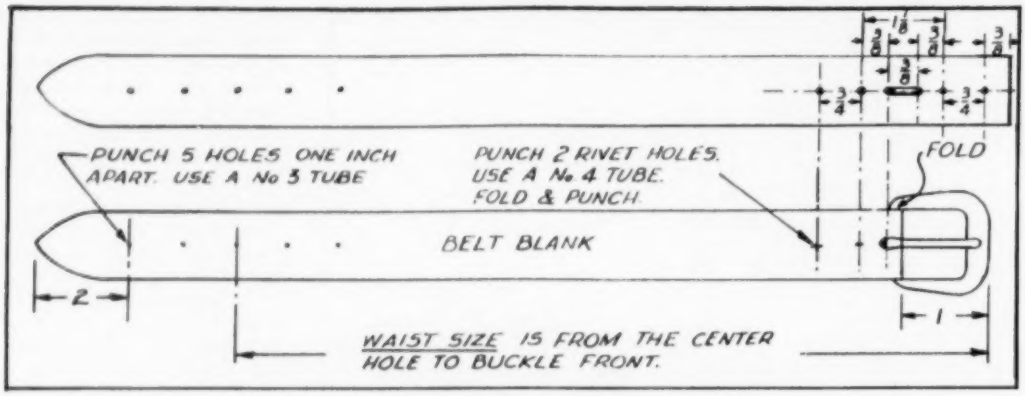

PUNCH 5 HOLES ONE INCH APART. USE A No 3 TUBE
PUNCH 2 RIVET HOLES. USE A No 4 TUBE. FOLD & PUNCH
FOLD
BELT BLANK
2
1
WAIST SIZE IS FROM THE CENTER HOLE TO BUCKLE FRONT.

Fig. 2. Layout of the belt

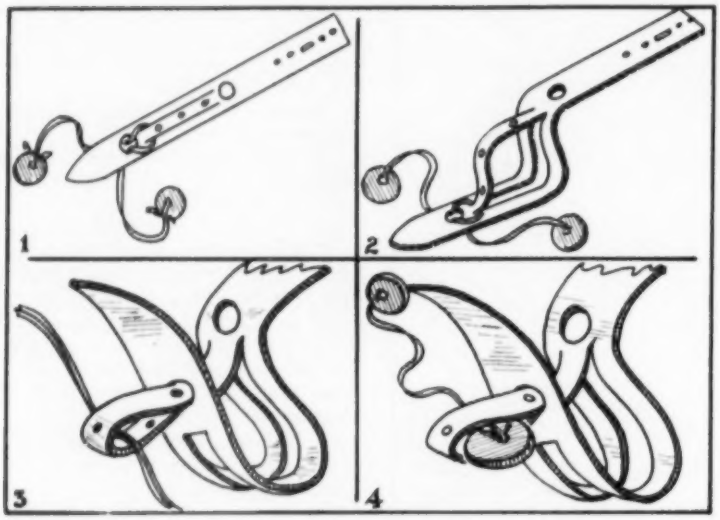


Fig. 3. The four steps in the solution of the puzzle

6. Measure 6 in. from the center hole to the fold. Punch slot a 3/16-in. oblong, punch over the center of the 6 in., thus giving the belt a 7-in. waist measurement. This procedure will hold true for any waist size given.

7. Moisten leather at the fold line, fold and punch rivet or snap holes.

8. Leather dressing may be applied if desired, but it is not necessary.

9. Grade the student on his work as if it were a completed belt.

10. To make this practice piece into a puzzle, punch two 3/16-in. diameter holes one over the first hole from the tip of the belt, and the other over the last hole. See 1, Figure 3. Cut two slits lengthwise between the holes, 5/8 in. short of each of the large holes. See 1, Figure 3.

11. Use about a foot of scrap lace or string, threaded through the first large hole and the slotted portion of the belt.

12. Cut two disks with a 1/2- to 1-in. diameter punch and tie one of them to each end of the lace, as shown.

13. Let the students work at solving the problem until the next class period. Their problem is to find out how to remove the lace from the leather belt.

News Notes

♦ The students in the five-year co-operative automotive curriculum at Wayne University, Detroit, Mich., will again be leaving Detroit during the summer session to attend the following factory training schools while they are enrolled in Wayne University courses: Barrett Equipment Company at St. Louis, Bear Manufacturing Company at Rock Island, Ill., Carter Carburetor Corporation at St. Louis, Clayton Dynamometer in Detroit, Delco-Remy in Anderson, Ind., Electric Auto-Lite Company at Toledo, General Motors Institute at Flint, Mich., Sun Electric Corporation in Detroit.

Those interested in participating should contact *Mr. Paul Powell, 5442 Second, Detroit 2, Mich.*

♦ Wayne University, Detroit, Mich., is offering an evening course, Vocational Education 202, *Principles of Vocational Education*, for those working during the day. This class is scheduled during the six-week summer session on Monday, Wednesday, and Thursday from 7 to 9. The class was not scheduled on Friday evening so that it would be convenient for persons in this group to go on week-end trips. This is one of the two basic vocational courses required of all trade teachers in Michigan whose salaries are reimbursed from vocational funds. Mr. Sonsmith is one of the resident vocational teacher trainers in the Detroit area; he has an excellent industrial and trade teaching background to offer this course.

♦ Two nationally recognized authorities in industrial-arts education will serve as visiting professors in the Oregon State College summer session at Corvallis, Ore., from June 21 to August 13, according to George B. Cox, head of the industrial engineering and industrial education departments.

Dr. Shriver L. Coover, head of the industrial-arts education department of Pennsylvania State Teachers College, and Dr. Stanley Pawelek, supervisor of industrial education for the Baltimore, Maryland public schools, will be on the industrial-arts education staff in addition to four other visiting instructors and five regular faculty members.

Summer courses in industrial arts and industrial education at OSC in recent years have brought industrial-arts teachers to the campus from twenty states and three Canadian provinces. A total of 29 different industrial-arts courses will be offered in the 1954 session.

♦ Ford Motor Company has posted $45,000 in awards to be given to junior and senior high school craftsmen during 1954 in the eighth annual Industrial Arts Awards competition.

Rule books and entry blanks are being mailed this week to 48,000 industrial arts and vocational education teachers and others interested in encouraging and recognizing outstanding work of American youth.

Winners will be announced August 16. Cash prizes, gold pins for outstanding achievement, and merit awards will go to more than 1500 competitors. In 1953, approximately 13,000 students entered the program.

Next September, the 30 top awards winners and their teachers will be guests of Ford Motor Company for three days of sight-seeing and entertainment in the Detroit area.

This year's competition will be divided into 14 divisions — mechanical drawing, wrought metal, patternmaking and molding, plastics, machine shop, woodworking, electrical, architectural drawing, printing, leather, ceramics, jewelry, model, and an open division.

Entries will be displayed at the Ford Rotunda, Dearborn, Mich., and at the Chicago Museum of Science and Industry in August and September.

The competition is open to students under 21 in grades 7 through 12 of any public, private, or parochial school. Projects must be a part of their regular work in shop, drawing or printing courses.

Ford Motor Co., Dearborn, Mich.

The American Optometric Association recommends that vision tests should be made at every renewal of a driver license.

Library . . . classroom . . . shop

Every room's a theater with this Pageant's versatile sound system

Auditorium acoustics are not as portable as a Kodascope Pageant Sound Projector. "Setting up theater" amid the banging clatter of the shop is a real problem. And even the "quiet-please" hush of the library may have a deadening effect on movie sound.

But there is a Pageant Projector specially designed to help you overcome these problems. Model AV-151-S, shown above, has a powerful high-fidelity 15-watt amplifier to meet unusually critical sound requirements. Separate bass and treble controls let you correct for boominess or deadness. And the exclusive Pageant Fidelity Control enables you to get the most out of your films, regardless of the sound-track position.

Yet, for easy portability, both the projector and the well-baffled 8-inch speaker fit compactly into a single carrying case.

Whatever your 16mm. projection problem, there is a Kodascope Pageant Sound Projector designed to meet the need. The AV-151-S is one of six outstanding models. Here's how each of the others can help you solve *specific* problems . . .

For all-around economy in sound *and* silent showings, the Model 1 is the top choice. Its 7-watt *true-rated* amplifier delivers plenty of power for average conditions. And the pre-lubrication feature—exclusive with Pageant Sound Projectors—eliminates maintenance problems throughout years of hard use.

In hard-to-darken rooms, you can give extra brilliance to every showing with a Pageant Model AV-071. Its Plus-40 Shutter provides *40% more light* than standard shutters . . . gives crisp, super-bright pictures anywhere.

To overcome sound difficulties in auditorium-size rooms, Model AV-151 has a powerful 15-watt amplifier and 12-inch speaker in a separate matching case.

To combine extra brilliance with added sound power, Model AV-151-E has the Plus-40 Shutter in addition to the 15-watt amplifier and separate 12-inch speaker.

For optimum all-around performance combined with compact portability, Model AV-151-SE has Plus-40 Shutter, 15-watt amplifier, and built-in-case 8-inch speaker.

Starting at a remarkably low $375, *all Pageant models are priced considerably below all other projectors in their class.* Price subject to change without notice.

Ask for free demonstration

Your Kodak Audio-Visual Dealer can help you select the Kodascope Pageant tailored to *your* individual movie-showing needs. Ask him for a demonstration soon—or send us the handy coupon below.

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"Our Service Department records show that most mechanical failures in motion-picture projectors are caused by improper oiling. Pageant pre-lubrication will definitely eliminate this oiling problem."
John T. Moore, Moore's Motion Picture Service, Portland, Oregon

"Over half the hundreds of dollars' worth of projector repair we do every year is caused by either too much or too little oiling. Therefore, I believe that the pre-lubrication of the Kodascope Pageant 16mm. Sound Projector is the biggest step forward in projector design in many a year, and it will certainly save the user a great many maintenance dollars."
Art Hansen, Jansen, Inc., Flint, Michigan

"The Pageant's permanent pre-lubrication is welcome news to the schoolman. No hourly oil records to keep, no freeze-up from lack of oil and no 'mess-up' from too much oil."
E. F. Burke, Burke's Motion Picture Co., South Bend, Indiana

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Kodascope Pageant Sound Projectors, Model 1 ☐ *Model AV-071* ☐
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NAME_____
TITLE_____
ORGANIZATION_____
STREET_____
CITY_____ (Zone)
STATE_____

Kodak

ASSOCIATION NEWS

(Continued from page 6A)

OREGON INDUSTRIAL ARTS ASSOCIATION CONVENTION

At the annual convention of the Oregon Industrial Arts Association held in Portland on March 18 and 19, the following officers were elected for 1954-55: president, Charles Ward, Senior High School, Redmond, Ore.; vice-president, Robert Veley, Woodmere School, Portland, Ore.; secretary-treasurer, Roy J. Lively, Senior High School, Bend, Ore.; board of directors, chairman, Alex Dawson, Sabin School, Portland, Ore.; Roby Goff, Senior High School, Corvallis — three-year term; Ed Klote, Senior High School, Grants Pass — two-year term; Robert L. White, Roosevelt High School, Portland — one-year term.

Resolutions were adopted in the interest of securing a state supervisor or consultant for industrial arts, and pledging a policy of affiliation with the national industrial-arts association.

Roy Lively, newly elected secretary-treasurer, and Roby Goff, a carry-over member of the board of trustees recently elected for a new three-year term, represented the Oregon Industrial Arts Association at the Los Angeles convention of the American Industrial Arts Association the following week. Ten other members of the Oregon association attended the A.I.A.A. convention.

NEW OFFICERS OF MU SIGMA PI

Officers of Mu Sigma Pi, Wayne University Industrial Education Fraternity are: president, Don Zwickey; vice-president, Harlyn Olsen; secretary-treasurer, Oscar Felden. Lee Litchfield is chairman of the board of directors. Andrew Althouse will continue as faculty adviser. Teacher recruitment will be the fraternity's chief project of the year. — *Don Zwickey.*

1954 AUDIO-VISUAL CONVENTION

The 1954 National Audio-Visual Convention and Trade Show will be held August 1-4 at the Conrad Hilton (formerly Stevens) Hotel in Chicago, according to a preliminary announcement of convention plans by Carroll M. Hadden of Hadden Films, Louisville, Ky., president of the National Audio-Visual Association. Those attending the meeting include audio-visual dealers and salesmen, film librarians, and audio-visual specialists from the educational, religious, governmental, and industrial fields.

Focus of the 1954 convention will be the ninth annual National Audio-Visual Trade Show, with more than 125 displays of new and standard audio-visual materials and equipment. Opening of the show will take place at 12 noon on August 1 and the closing will be at 1 p.m. on August 4.

♦ Theta Chapter of Epsilon Pi Tau has accepted five new members into its organization following an oral examination held on Monday, April 5. The formal initiation and banquet was held Saturday, April 10.

The five new members welcomed by Theta Chapter are Jerome Abbott, Robert Erickson, George Francis, Harold Halfin, and James Young.

An initiation team consisting of Edward Treise, Bill Stern, Tom Kitto, Robert Swanson, Phillip Mann, Howard Vetter, Philip Ruehl, and John A. Jarvis performed the rites of the formal initiation.

A banquet was held at the Hotel Marion following the formal initiation. Edward Treise, president of Theta Chapter, acted as toastmaster and Dean M. M. Price gave the welcome address to the new members. Dr. Dwight Agnew, head of the department and associate professor of Social Science, delivered the main address.

Dr. Agnew spoke on the chain of events leading to the beginning of The Stout Institute. The speaker discussed briefly the events leading to the beginning of manual training in the United States, and how Professor Woodward pioneered a manual training school in St. Louis. With this foundation, Dr. Agnew proceeded to relate the interest developed by a young man, James H. Stout, which led to the development of the Stout Manual Training School, and the subsequent changes which resulted in Stout as a teacher-training school.

New "DYNO-MITE"

POWER WOOD BITS

Stay sharp 10 times longer — even cut through screws and wire nails

Still going strong after boring through 15 ft. of hard maple, 188 screws, and 376 wire nails! That's the remarkable record of a *single* "Dyno-Mite" Bit used to prepare demonstration blocks like the one shown above.

The secret? "Dyno-Mite" Bits have *high-speed steel blades* — yet they cost no more than ordinary, tool-steel bits. They cut clean and fast in cross or end grain — start readily even at angles — stay sharp 10 times longer.

Order a set of "Dyno-Mite" Bits from your supplier and see for yourself why these remarkable new bits are revolutionizing power boring in any kind of wood.

MILLERS FALLS COMPANY, Dept. 1A-3, Greenfield, Mass.

MILLERS FALLS TOOLS SINCE 1868

The Mark of Superiority

6 SIZES

3/8", 1/2", 5/8", 3/4", 7/8", 1"

Available separately or in sets of 6 or 4 complete in handsome plastic rolls

All shanks fit 1/4" chucks

Depth of cut: 3"

12" Extension available

Personal News

DR. WILMER SOUDER RETIRES

Dr. Wilmer Souder, consultant to the National Bureau of Standards retired from federal service on February 28, 1954. Associated with the Bureau for 39 years, Dr. Souder was organizer and first chief of the Bureau's Dental Research Laboratory and the Identification Research Laboratory. He is internationally known for his work in both crime detection and dental materials.

JOHN CLAUDE HONORED

John Claude, national school sales supervisor with Rockwell Manufacturing Company's Delta Power Tool Division, has been named a laureate member of Epsilon Pi Tau, national honor society in the industrial arts and industrial education field.

Mr. Claude was installed in recent ceremonies at the University of California marking the national society's "Silver Anniversary."

He has spent more than 35 years in the fields of industrial arts and vocational education.

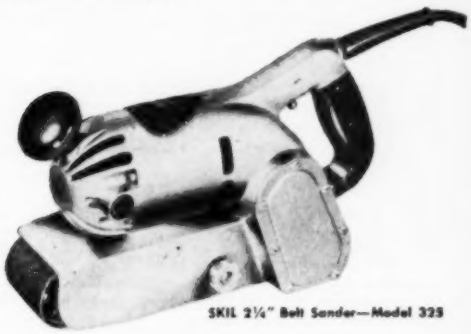
(Continued on page 18A)

SKIL Belt Sanders do double duty...in training ...in maintenance!

TRAIN STUDENTS WITH THIS TOOL THEY'LL USE AS PROFESSIONALS ...A MODEL FOR EVERY NEED

SKIL Belt Sanders give satin-smooth finishes ten times faster than sanding by hand. And not only are they ideal for your training needs, but in refinishing blackboards or desks, chairs, tables and other school furniture, there is no finer tool made to do the job in minimum time, at minimum cost.

SKIL Belt Sanders are preferred over other makes because of their better balance and better design. They stand up under years of constant hard use.



SKIL 2¼" Belt Sander—Model 325

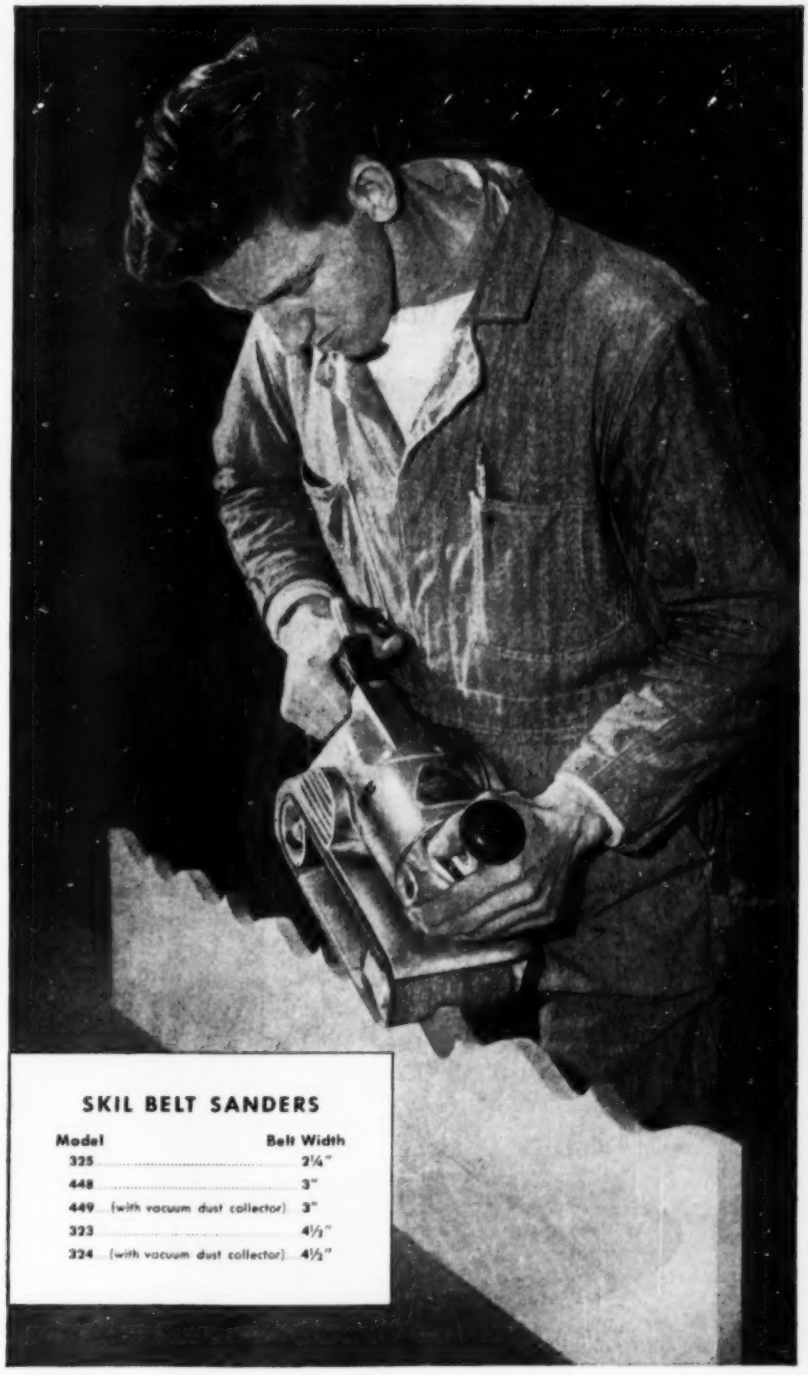
SKIL Belt Sanders for fast finishing at lowest cost

Unequalled for both rough and fine sanding of wood, plastics or compositions and metals. Available in five models for any application. The right side of the SKIL Belt Sander is flush with belt edge to permit sanding next to upright objects. Indicator window permits quick check of oil level. Worm and wheel gearing transmit high torque to drive pulley through high-speed chain.

See Your Distributor for Complete Information or Call Your Nearby SKIL Factory Branch Office

SKIL
PORTABLE TOOLS

Made only by SKIL Corporation
formerly SKILSAW, Inc.
5033 Elston Avenue, Chicago 30, Illinois
3601 Dundas Street West, Toronto 9, Ontario
Factory Branches in All Leading Cities



SKIL BELT SANDERS

Model	Belt Width
325	2¼"
448	3"
449 (with vacuum dust collector)	3"
323	4½"
324 (with vacuum dust collector)	4½"

PERSONAL NEWS

(Continued from page 16A)

NEW PRESIDENT OF THE AMERICAN INDUSTRIAL ARTS ASSOCIATION

Gerald Baysinger, associate professor of industrial education at Wayne University, Detroit, Mich., was elected president of the American Industrial Arts Association at the annual meeting of the national group in Los Angeles.

Mr. Baysinger has served as officer of numerous other professional organizations and is the immediate past president of the American Council on Industrial Arts Teacher Education. He is author of many articles on industrial arts and education.

He was instrumental in organizing the Industrial Education Guild, 1949, and in 1951 helped establish at Wayne the Alpha Omicron Chapter of Epsilon Pi Tau, honorary professional fraternity in industrial education.

♦ EDWARD C. LLOYD has been appointed Chief of the Mechanical Instruments Section of the National Bureau of Standards, Washington, D. C., following the retirement of Dr. W. G. Brombacher. Mr. Lloyd has been acting as assistant chief of the Office of Basic Instrumentation at NBS, a position which kept him in close touch with developments in the field of mechanical instruments.

Mr. Lloyd came to NBS from the Navy Department, Bureau of Ships, where he had served for two years as Principal Marine Engineer. He was born in Chicago, received a B.S., in engineering from the University of California in 1938, and is the author of various technical articles and is the holder of three patents concerned with marine engineering.

♦ MRS. MARY K. BARBER, formerly of New York University's Center for Safety Education, has been appointed traffic safety analyst of the accident prevention department of the Association of Casualty and Surety Companies.

Mrs. Barber had been associated with the Center for four years.

♦ DAVID M. FREUDENTHAL was elected chairman of the Advisory Board for Vocational and Extension Education of New York City. The board is composed of representatives of trades, industries, and occupations appointed by the board of education.

A business consultant, Mr. Freudenthal was formerly vice-president and treasurer of Bloomingdale Brothers, the department store, and special assistant chief of mission of the Economic Cooperation Administration at Rome.

♦ DENNIS A. CESSNA, of the Hutchinson Fire Department, has been appointed state fire department instructor at the University of Kansas. The State Board for Vocational Education cooperates in this program.

Mr. Cessna replaces Dale McMurry, who entered active service with the marine air corps.

♦ JOE DESPAIN, printing instructor, Altamont, Kans., has been called into the navy service. Since World War II, he has been in the naval reserve.

♦ W. H. WAGNER of Iowa State Teachers College, industrial-arts staff, has been added to the State Committee on Life Adjustment.

♦ VERNON DUNHAM, M.A. degree of Pittsburg, Kansas Teachers College, has been added to the industrial-arts staff of Iowa State Teachers College.

♦ DICK ALLEN, who developed the Woodside, Iowa, industrial-arts program, has moved to Des Moines, to the Callanan Junior High School, and has been replaced at Woodside by KENNETH KELLING, B.A., Iowa State Teachers College.

DeWITT G. MANLEY PROMOTED

DeWitt G. Manley has been promoted to field sales manager for American Type Founders, Elizabeth, N. J. He will direct the selling activities of ATF's 12 regional offices throughout the country, and will be responsible for the sales volume of all products sold by the company.

Sheldon FURNITURE

IS EDUCATIONALLY CORRECT

You can have a shop tailored to your needs . . . fine units, thoughtfully dovetailed into efficient patterns to set up your heaviest schedule. You'll find your classes run smoother because there's a place for everything, uncluttered, easy to keep in order. And every Sheldon piece glorifies craftsmanship, design-to-a-purpose, full space use. A Sheldon shop is educationally correct.

E. H. SHELDON EQUIPMENT COMPANY
MUSKEGON • MICHIGAN

Sheldon FURNITURE

FOR HIGH-SCHOOL SHOPS, LABORATORIES, HOMEMAKING ROOMS, AND STUDIOS

New Publications

Materials and Processes

By James F. Young. Cloth, 1074 pp., 6¼ by 9¼ in., illus., $8.50. John Wiley & Sons, Inc., New York 16, N. Y.

This is the second edition of a text which belongs to a series written in the interest of the General Electric Engineering Educational Programs.

The subject presents the material in the following form. The nature of pure metals, alloys, metallographic examination, mechanical properties of metals, corrosion and tarnishing of metals, electrical and magnetic properties of metals, iron and steel, nonferrous metals and alloys, nonmetallic materials, electrical insulation, plastics, rubber, ceramics, miscellaneous materials,

(Continued on page 20A)

TEACH METALWORKING NEXT FALL THIS EASY, MODERN WAY

Aluminum storm sash and screens that never rust or stain are fun to make with Reynolds *Do-It-Yourself* Aluminum . . . and so much easier than wooden ones! Tools required: a hammer and ordinary woodworking saw!

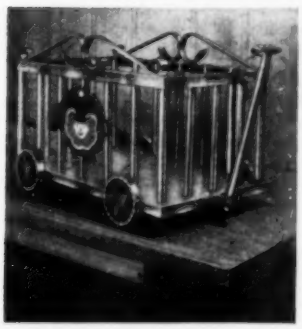
...WITH AMAMAZING

REYNOLDS *DO-IT-YOURSELF** ALUMINUM

No special equipment needed . . . just standard woodworking hand or power tools! Be ready when classes start. Order your supplies of this aluminum now.

Unlike ordinary metals, this aluminum can be worked even by the youngest student in your school. Yes, it's *that* easy to make things with Reynolds *Do-It-Yourself* Aluminum. Here's the secret. Although Reynolds *Do-It-Yourself* Aluminum has all the beauty, rustproof qualities and permanence of *regular* aluminum, it is made for really astonishing workability. You can bend it, saw it, drill it, plane it, joint it, using standard woodworking hand or power tools. And it's so easy to use that *any* student can make any of 1001 handsome, professional-looking projects for the home. You'll certainly want *your* classes to learn about this fabulous metal. Why not drop us a card today?

*T. M. Reynolds Metals Company

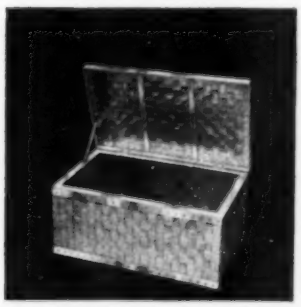


HANDY TOY HOPPER with a circus motif is a fine, low-cost project for your older grades . . . and a "must" for homes with kids!

Luggage carrier that adds so much to travel-fun is a simple . . . and inexpensive . . . project with Reynolds *Do-It-Yourself* Aluminum.

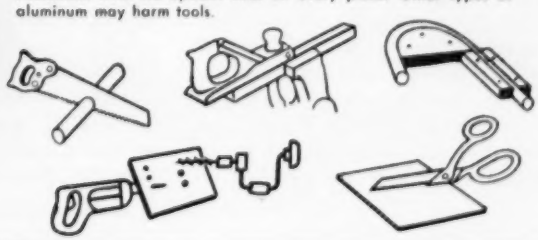
NO SPECIAL TOOLS are needed to work Reynolds *Do-It-Yourself* Aluminum . . . you can saw it, plane it, joint it, shape it, drill it with standard woodworking hand or power tools.

CAUTION: This new material is approved by leading tool makers. You are cautioned, however, to use only Reynolds *Do-It-Yourself* Aluminum with the Special Seal on every piece. Other types of aluminum may harm tools.



PICNIC HAMPER is handsome and professional-looking. Students have a picnic making this one!

MAIL BOX is fun to make with this wonder-metal . . . so practical, too, because it won't rust ever!



REYNOLDS *DO-IT-YOURSELF* ALUMINUM
consists of:
TUBING • RODS • BARS • ANGLES • PLAIN SHEETS
EMBOSSED SHEETS • SCREEN AND STORM SASH SECTIONS
FASTENERS • TRIM STRIP • WINDOW HARDWARE

WRITE TODAY . . . be ready for the fall semester! Complete information available . . . also free "how-to" book and details of easy-to-follow plans.

REYNOLDS *Do-It-Yourself* ALUMINUM,
2479 South Third Street, Louisville 1, Kentucky

Investments in Quality

that inspire
lifetime
craftsmanship

No. 11RS Micrometer. Measures 0 to 1" by thousandths. Has enameled, "I" section frame . . . 3/16" anvil projection for convenience in measuring counterbores and slots.

No. 13RS Micrometer. Measures 0 to 1" by ten-thousandths and thousandths. Narrow anvil end permits measuring in deep slots.

When your students buy Brown & Sharpe Micrometers, they're investing in quality instruments that pay-off with a lifetime of inspiring performance. These fine precision tools are inherently easier to use. They create confidence during the school years . . . develop increasing pride in precision during apprenticeship . . . assure finest craftsmanship on the job. And no matter which model a student selects, he's getting one of America's only micrometers with stainless steel spindle and screw . . . another "lifetime" advantage not obtainable with lower cost tools. For complete details on these and other top-quality machinists' tools, write for new Catalog 35M. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

Buy Through Your Local Dealer

Brown & Sharpe B·S

NEW PUBLICATIONS

(Continued from page 18A)

casting processes, powder metallurgy, heat treating, hot and cold working processes, welding and allied processes, machining, cleaning and plating metals, gauging and nondestructive testing, and statistical methods in industrial quality control.

English for Vocational and Technical Schools

By John T. Shuman. Cloth, 411 pp., 5⅝ by 8¼ in., illus., $3.50. The Ronald Press Co., New York 10, N. Y.

This is the second edition of this text that was specially designed for vocational and technical students. It develops skill in written and oral English by means of practical examples and illustrations which are meaningful to those engaged in industry or in small businesses of their own. The student is constantly shown that ability to write and speak good English can make a definite contribution to his vocational competence.

The five parts of the book aim to help the student to acquire the minimum essentials of good writing and speaking, learn what is needed to apply good English to his job, acquire the knack of writing good letters, learn what is required to write advertisements that sell, and write good reports.

Selected Characteristics of Reorganized School Districts

Office of Education Bulletin 1953, No. 3, 49 pp., 20 cents a copy.

Educational Change in Reorganized School Districts

Office of Education Bulletin 1953, No. 4. 53 pp., 20 cents a copy.

Both bulletins were prepared by C. O. Fitzwater, Specialist in County and Rural School Administration, Division of State and Local School Systems, Office of Education. They may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

During the past 10 years, the total number of local school districts in the United States has been reduced by more than one fourth. The success of these programs of reorganization of small districts into larger administrative units that are more capable of providing needed educational services has attracted nationwide attention.

The real significance of what has taken place lies in the characteristics of the new districts established and in the educational improvements resulting from their establishment. These two new Office of Education publications present this information obtained from a survey of more than 500 reorganized districts in California, Idaho, Illinois, Michigan, Minnesota, Missouri, New York, and Washington. The chief state school officers in each of the eight states approved the study and in each instance designated a staff member to assist in conducting it.

Selected Characteristics of Reorganized School Districts reports characteristics of reorganized units, such as those relating to size, physiographic features, population factors, property valuation, etc.

Educational Change in Reorganized School Districts examines the educational changes made in reorganized districts and views the results of reorganization. It points out that the real test lies in what is done for the pupils. One section titled "Changes in the School Program" gives information on courses that have been added to the elementary and secondary school programs.

Course Construction in Industrial Arts and Vocational Education

By J. W. Giachino and Ralph O. Gallington. Cloth, 146 pp., 5¾ by 8½ in., $3.50. American Technical Society, Chicago, Ill.

This text will assist those teachers who want to assemble a core of essential and related work experiences which will affect the attainment of desired goals of achievement for their students, in the areas of both or either of the vocational and the industrial arts.

The 17 chapters treat the subject under the following headings: basic elements of an instructional plan, instructional areas, factors involved in developing a course of study, the introductory statement — formulating the plan of instructional practices, developing a statement of educational philosophy, the course objectives, the instructional analysis, the basic operations, arranging the operations in an instructional order, selecting work jobs and projects, the related information, the completed course of study, instruction sheets, student planning, and student study guides.

Graphic Architectural Drafting

By J. Edgar Ray. Cloth, 256 pp., 8 by 10½ in., illus., $4.80. McKnight & McKnight Publishing Co., Bloomington, Ill.

The author of this text has had years of both journeyman and teaching experience in building construction and architectural drafting. The text which he has written shows the effect of this valuable preparation for writing a book that will be useful to the student who is about to learn architectural drafting, or to the journeyman who wants to take a refresher course in his particular building trade.

The text presents the following divisions and subjects of architectural drafting: plan walls; details of cellar windows and sill construction; framing; roofs and cornices; double hung and casement windows; details of stairs, fireplaces, brickwork, exterior doors, entrances, decorative cupboards; plumbing, bathrooms, and kitchens; wall sections from footings to cornices; building trade terms; preliminary sketches; plans, elevations, sections, and details; perspective drawing; techniques with pencil, inks, and pastels; architectural modeling; architectural styles; problems for classroom study; and dimensions of household equipment, furniture, and closets.

Single Stroke Drafting Lettering

By A. K. Rigast. Paper, 96 pp., 9⅛ by 5¾ in., 64 cents. The Bruce Publishing Company, 400 N. Broadway, Milwaukee 1, Wis.

A very fine lettering text for the beginner draftsman. The author has divided the work into 24 lessons.

He has been chairman of the industrial-arts and drafting departments, Sacramento Senior High School, Sacramento, Calif., for 13 years, during which time he perfected the system embodied in this brochure.

The alphabet chosen for this text is the slant, single stroke which can be quickly mastered by the student, and is very pleasing when well executed.

Diesel and High Compression Gas Engines — Fundamentals

By Edgar J. Kates. Cloth, 396 pp., 5¾ by 8½ in., illus., $5.50. American Technical Society, Chicago 37, Ill.

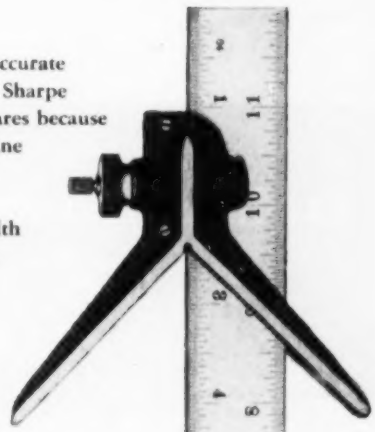
This is a text that is arranged in logical step-by-step instructions in the fundamentals of both Diesel and high compression gas engines.

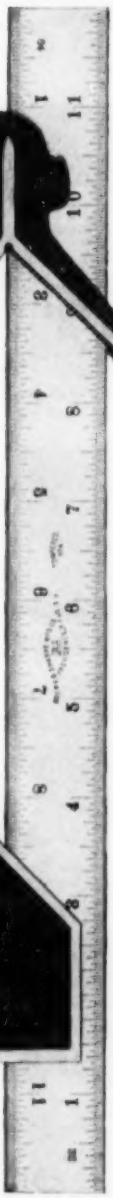
The book describes what the Diesel engine is, what its distinguishing features are, explains the constructional features, gives the basic physics and engineering principles underlying this engine, presents information about heat and combustion, oils and fuels, engine power and fuel consumption, engine rating and performance, the various parts of the engine, and its operation and maintenance.

Graduated with Distinction...

these "clean-cut" scales aid student accuracy

Students make faster, more accurate measurements with Brown & Sharpe Rules and Combination Squares because *all* the graduations on these fine tools stand out clearly . . . easily readable. Every subdivision is of uniform width and depth . . . a *distinct* unit of length, machine-cut in highest quality steel for lasting accuracy. In addition, every blade is exactly the length it should be . . . a full measure of precision. Rules are available in every style and size used by technical students and craftsmen. Combination Squares and Sets are adaptable to the widest variety of uses. Catalog 35M gives complete description.





No. 306A Flexible Steel Rule graduated in 32nds and 64ths. Available with leather case if desired.

All Brown & Sharpe Combination Squares feature the exclusive reversible bolt which permits use of either side of blade. No. 402, shown at right, available with 6", 9", 12", or 24" blade.

FREE TRAINING AIDS—*Write for wall and pocket-type decimal equivalent charts . . . booklets on how to use various Brown & Sharpe Tools . . . big tool charts. Free to students and instructors. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.*

Buy Through Your Local Dealer

Brown & Sharpe B·S

SHOP EQUIPMENT NEWS

(Continued from page 29A)

adapter also increases the versatility of this vise which normally operates from and rotates around a standard base. The Gyro-Vise works equally well in any upright or *on-its-side* position. Weight of the adapter is 2¼ lb.

For further information write to *The Columbian Vise & Mfg. Co., Cleveland 4, Ohio.*

(For Convenience Circle Index Code 0608)

NEW ORNAMENTAL TYPE CUTS

American Type Founders announces several additions to its line of ornamental material and typographic sundries.

Troyer Zodions, based on the signs of the Zodiac, will fill a need for something fresh and different for decorative spots. Drawn by the well-known graphic artist, Johannes Troyer, the new Zodions are available in two sizes, 36 and 48 point.

Typecast Antiques have been revived by popular demand after a long absence from the ATF catalog. These cuts with a Victorian flavor of intriguing design will find a warm welcome by printers and designers alike. Four different assortments are available.

Adstyle Figures, though not new, will be a useful addition to many type cases. They appear in 12- and 18-point sizes, each font consisting of an assortment of figures from 1 to 0, in both regular and reverse design.

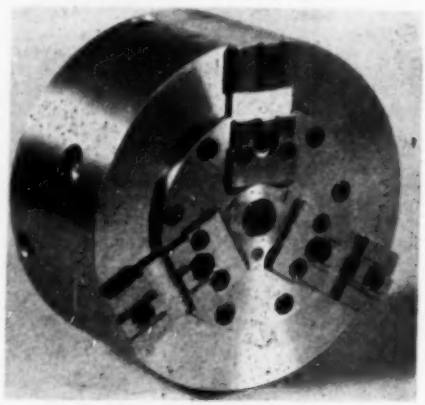
American Type Founders, 200 Elmora Ave., Elizabeth B, N. J.

(For Convenience Circle Index Code 0609)

It's a Trick of the Trade . . .
CHALLENGE BOOK GUIDE
THE CHALLENGE MACHINERY CO.
GRAND HAVEN, MICH.
To get an even cutting edge and assure neater book trimming, use a pair of guides on the backgage. You can buy a book guide to fit any backgage finger up to 1/2" thick.
Challenge 370 Automatic (Hydraulic Clamp) Cutter
Diamond (Hand Clamp) Power Cutter
Challenge 265-305 Lever Cutter
Challenge 265-305 (Hydraulic Clamp) Power Cutter
Challenge Pony Lever Cutter
BUT IT'S NO TRICK TO DO AN ACCURATE JOB WITH A DEPENDABLE
Challenge Cutter
Regardless of your shop size, there is a Challenge cutter for you. There are 11 styles and 7 sizes to choose from, ranging from lever cutters in bench and floor models — to power cutters with hand or hydraulic clamp. Each of these cutters has been perfected by Challenge engineers to give the operator maximum protection . . . more working freedom . . . and precise control of cutting operation. A Challenge cutter is a long term investment that pays off in less maintenance . . . greater safety . . . more accurate cutting.
7038
THE CHALLENGE MACHINERY COMPANY
Office, Factories and Show Room:
GRAND HAVEN, MICHIGAN
Over 50 Years in Service of the Graphic Arts
DEALERS IN ALL PRINCIPAL CITIES
Challenge
TRADE-MARK ®

NEW BUCK TOOL COMPANY CHUCKS

Buck Tool Company is announcing a new 12-in.



Buck Tool Company 12-in Chuck

Adjust-Tru Air and Adjust-Tru Scroll Chucks, which will maintain precision within .001 in.

It is a wedge-type actuated chuck which overcomes many disadvantages possessed by other type chucks.

Some of the outstanding features of these chucks are: (1) great time saving in machining top jaws; (2) accuracy attained is .001 in. or finer; (3) top jaws have a long wear without the need to grind or regrind jaws when chucking or rechucking a job; (4) the Buck Chuck can be adjusted true under full line pressure.

This new Buck Chuck can be used on present equipment, but the company will also supply air cylinders on order.

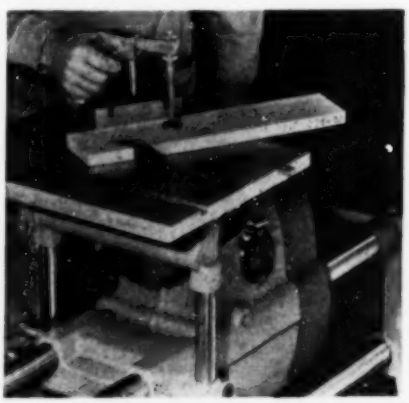
For further information write to *Buck Tool Co., 2015 Schippers Lane, Kalamazoo, Mich.*

(For Convenience Circle Index Code 0610)

NEW SAFETY GRIP AND AUTOMATIC SPEED CONTROL

The Magna Engineering Corporation has developed a new safety grip for use on their circular saw. It is named the Shopsmith's Miter Gauge Safety Grip. With this new accessory even the beginner can saw like a real mechanic. His hands need not touch the wood while he is sawing.

The new grip also eliminates the tendency for the wood to creep across the miter gauge when making miter cuts.



Another new addition to their Shopsmith Mark 5, is the automatic speed control, a speed dial, which permits the operator to make the setting for the right speed as easy as dialing a

(Continued on page 24A)

All signs for School Supplies point to the MASTER B-G CATALOG

Plastics
Lumber
Drill Presses
Period Furniture Trim
Spray Painting Equipment
Fine Arts Supplies
Etc., Etc.

Drafting Tables
Shopsmith
Woodworking Benches
Molders Equipment
Soldering Supplies
Lapidary Supplies
Drafting Supplies
Etc., Etc.

This big 1954-1955 edition—just off the press—is a regular storehouse of all the things you need to equip, modernize or enlarge your industrial arts department—and offers the further convenience of one source buying at substantial savings in time and money. It describes over 15,000 of the most wanted, most needed machines, supplies and equipment. If you are on our mailing list—your copy is in the mail; if not on our mailing list, send for your copy today.

BRODHEAD GARRETT CO.

4560 E. 71 ST. CLEVELAND 5. OHIO

EVERYTHING IN INDUSTRIAL ARTS SUPPLIES

SHOP EQUIPMENT NEWS

(Continued from page 22A)

telephone. There are no belts or pulleys to change. Note protective wings for switch which allow it to be knocked off instantly, but prevent turning it on accidentally.

For further information about these new accessories write to *Magna Engineering Corp., Menlo Park, Calif.*

(For Convenience Circle Index Code 0611)

NEW POWER OPERATED PAPER CUTTER

The Challenge Machinery Company announces the development of a 19½-in. power operated paper cutter. Listed as Style 193 Semi-Hydraulic Power Paper Cutter, this new model has smooth hydraulic power applied to the knife. The hand clamp is operated by an easy-running wheel.

New Safety Grip and Automatic Speed Control →

New Power Operated Paper Cutter

One of the important safety features of this cutter is the dependable, foolproof operating mechanism which makes it compulsory for the operator to keep both hands on the controls to complete a cut.

Other features include solid center support, "duplex" measuring tape, positive back gauge, and a baked-on "wrinkle" finish which adds to the appearance of the cutter.

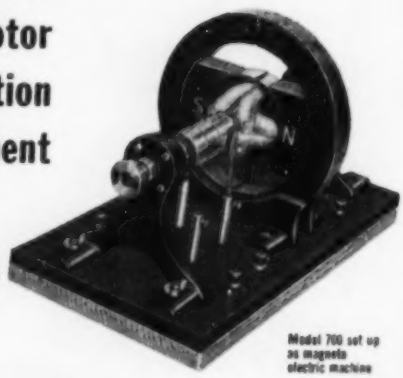
For further information write to *The Challenge Machinery Co., Grand Haven, Mich.*

(For Convenience Circle Index Code 0612)

NOW

...teach DC-AC motor construction and operation by Visual Experiment

with CROW ELECTRI-KIT model 700



Model 700 set up as magneto electric machine

ROTATING ELECTRIC MACHINE

For the first time—a kit so simple, so practical that high school students can grasp the principles of electric motors, generators and alternators readily. Assemblies built from Model 700 components perform exactly like commercial machines, yet the kit's ingenious design makes it amazingly easy to assemble and operate.

- Same basic parts—baseboard, frame ring, axle and bearings—are used in every experiment.
- Kit can be used anywhere . . . no special wiring, floor space or floor load problems.
- Safe—cannot shock. Operates on six to 110 V. DC or 110 V. 60-cycle AC.
- Motors can be assembled and disassembled with only a screwdriver.
- Students see all parts and coils in operation at all times.

NEW, COORDINATED TEXT-MANUAL MAKES COURSE EASY TO TEACH, EASY TO LEARN!

On a cost per experiment basis, the Crow Rotating Electric Machine is by far the most economical equipment you can buy.

- Completely new. 270 pages, 65¼ pictures.
- Reduces theory, assembly and operation of rotating electric machines to simplest possible terms. Course can be taught easily by instructors with very limited electrical training.
- Divides each experiment into four sections:
  1—Discussion of theory involved.
  2—Demonstration by instructor.
  3—Step-by-step instructions for assembly of machine.
  4—Comprehensive pictorial review.
- Assemblies cover 25 machines including . . .
  Permanent magnet generators and motors
  DC series shunt and compound generators and motors
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Descriptive Material

BRODHEAD-GARRETT COMPANY CATALOG

The 1954–55 Brodhead-Garrett Catalog is now available. Its 320 pages contain a wealth of material describing and illustrating the equipment, tools, materials, and supplies needed in the large number of school shops in which industrial arts and vocational education is taught in the schools of our country.

Among the many items listed are lumber, benches, and furniture, ceramics, electrical supplies, hardware, machinery, hand and power tools, instruments, and supplies for crafts, fine arts, mechanical drawing, etc.

For your copy write to *Brodhead-Garrett Co., 4560 East 71st St., Cleveland 5, Ohio.*

(For Convenience Circle Index Code 0613)

NEW CATALOG ON GAS REGULATORS

Air Reduction's complete line of gas regulators is fully described in the new 36-page catalog now being offered. Cylinder, manifold, and pipeline regulators are illustrated with complete descriptions covering specifications and operating data.

Each regulator has a chart showing types of gauges used with it, inlet and outlet connections,

(Continued on page 30A)

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Of particular interest to instructors – in woodworking, general shop, plastics, crafts, electricity, and many other shop courses. Students can design and make the body of the lamp. We supply all other parts necessary – sockets, cords, plugs, shades, harps, switches, etc. Over 700 different parts shown in wholesale catalog. A MUST for all instructors interested in keeping students occupied with highly educational and useful projects. Send 25¢ today for wholesale price list and parts catalog – refundable on first order.

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This modern furnace gives you the temperatures you want for heat treating carbon and high speed steels, tools, dies and small metal parts. Fast warm up saves classroom time. Easily regulated with accuracy. Uses natural, mixed, artificial, or bottled gas. Very economical in operation. Firebox 5 x 7¾ x 13½. Complete with Carbofrax hearth, G.E. motor and Johnson blower.

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FREE CATALOG

JOHNSON GAS APPLIANCE CO.
585 E AVENUE N.W. CEDAR RAPIDS, IOWA

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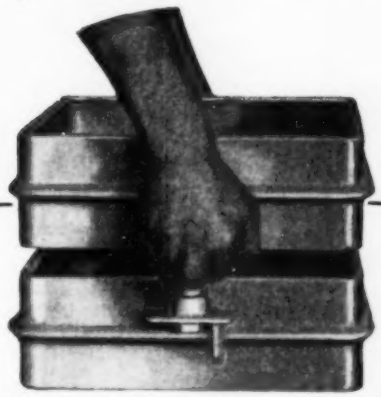

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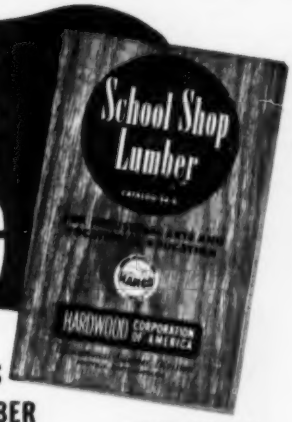

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SHOP EQUIPMENT NEWS

WOOD BORING SET AND "SPEE-D-GRIP" SCREW DRIVERS

Stanley Tools have just put on the market a new set, No. 125A, of five electric wood boring bits with the 50-50 Brad-Screw Point — half brad, half screw. These solid center bits are designed to put new performance and versatility within the reach of every power drill owner. Short shanks allow use in restricted areas where boring up to three inches in depth is desired. Screw portion of point leads bit into wood quickly; flat side of point enables user to withdraw bit instantly from any depth for complete controlled drilling. Each bit is fully heat treated

No. 125A Electric Wood Boring Drills

to hold a keen cutting edge. Five most useful sizes: 1/16, 5/16, 9/16, 7/16, and 2/16 in., are accurately sized to bore holes exactly as specified.

For further information write to *Stanley Tools, New Britain, Conn.*

This firm also manufactures a new line of rugged, well-made screw-holding screw drivers, known as the Stanley "Spee-D-Grip" Drivers, which feature tempered steel jaws that open automatically when sleeve on driver is pushed forward. These screw drivers are designed for driving and seating screws in hard-to-get-at places. They make possible the accurate positioning of screws for easy starting. A slight backward pull, after the screw is started, snaps the jaws free and leaves the tip clear.

"Spee-D-Grip" Drivers

The screw drivers are equipped with handles of tough amber plastic.

Four types of bars are offered in the line, Nos. 415, 416, 417, 1451, and 1452, with a total of 11 sizes for the four. Nos. 1451 and 1452 have crosspoints to fit recessed head screws.

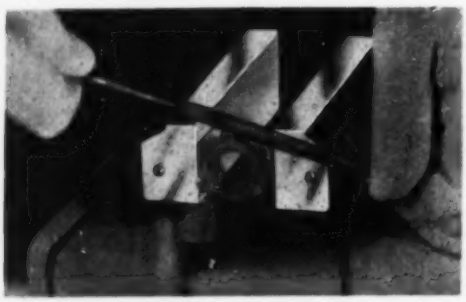
For further information write to *Stanley Tools, New Britain, Conn.*

(For Convenience Circle Index Code 0601)

NAVA-MAR VISE JAW FACE PLATES

Nava-Mar Vise Jaw Face Plates, manufactured by The Kenimar Corporation, protect soft and finished materials from being marred by the vise jaws.

Their use eliminates time wasted on makeshifts, and saves product and money through efficient and accurate work.



Nava-Mar Vise Jaw Face Plates

Nava-Mars are made in 1/4-in. sizes to fit any standard make of vise up to 6 in. Fastened by a setscrew, they become an integral part of the vise jaw, yet can be removed by a turn of a screw driver.

They are made in bronze, aluminum, and fiber or babbitt facings bonded to aluminum bodies. They are accurately machined for use on precision work.

Nava-Mars have been endorsed by leading vise manufacturers and are sold through industrial distributors.

For further information write to *The Kenimar Corp., Two Oak Ridge St., Greenwich, Conn.*

(For Convenience Circle Index Code 0602)

NEW FLYBACK AND YOKE TESTER

Electronic Instrument Company has just released its new Flyback Transformer & Yoke Tester in Kit and Wired Instrument form.

Model 944 makes the testing of *all* types of flybacks and yokes quick, easy, and positive — in or out of the TV set. A very important, and exclusive, feature of this instrument is its separate calibration for air core and iron core flybacks, which assures dependable, accurate testing of all types.

Its large 4½-in. meter and three separate three-colored scales make for easy reading. Its new compact size, 8½ by 5 by 5 in., provides easy portability.

The kit comes complete with easy-to-follow assembly and operating instructions.

For complete information on this new model and the rest of the complete EICO line of 38 kits and 42 wired instruments, write to *Electronic Instrument Co., Inc., 84 Withers St., Brooklyn 11, N. Y.*

(For Convenience Circle Index Code 0603)

Flyback Transformer and Yoke Tester

HAND-SAW RETOOTHER AND TOOTH SETTER

The new Model 32000 Foley Automatic-Hand Saw Retoother quickly restores any handsaw to like-new condition.

Model 32000 Foley Hand Saw Retoother

In less than a minute, a V-shaped steel punch cuts away old irregular teeth and forms perfect new rip or crosscut teeth of any size from 4 to 16 points per inch. Saw handles need not be removed.

A dial indicator insures any desired tooth pitch from 0 to 30 degrees, and the ability to produce either a straight or a crowned toothed edge. Saws travel through the Foley Retoother on the same carriers used by the manufacturer's saw filing machines, eliminating further setup adjustments.

The Foley Retoother is furnished with choice of hand or motor drive. Hand drive can be converted to power drive at any time.

This firm also manufactures a machine which gives both rows of teeth — both sides of saw — a perfect, uniform set in one speedy run through the new No. 32000 Foley Automatic Power Setter.

A 26-in. 8-point handsaw is set in 32 seconds. This speed and precision results from the exclusive Foley "twin-hammer" action, powered by a single spring.

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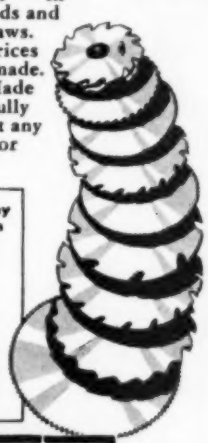

Rip . . . Cut-off . . . Easy Cut and Combination	
6"	1.75
7"	2.00
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9"	2.65
10"	3.15
12"	4.35

Supplied with round or special shape holes as shown.

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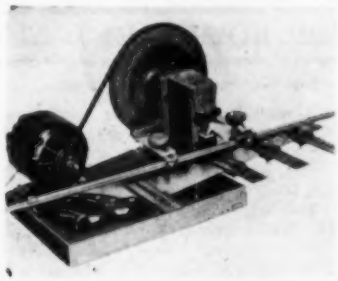


Only three easy adjustments are needed for automatic operation — insert saw, select points per inch (from 4 to 16), adjust depth of set.

For complete information address *Foley Mfg. Co., 3300 Fifth St., N.E., Minneapolis 18, Minn.*

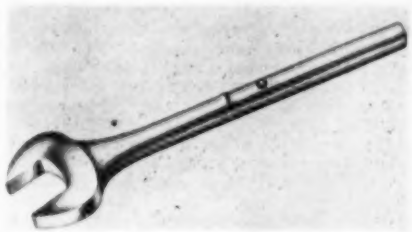
(For Convenience Circle Index Code 0604)

HEAVY DUTY OPEN END WRENCHES

Snap-on Tools Corporation, Kenosha, Wis., now has available a new line of heavy duty open end wrenches that are used with detachable tubular handles. The series consists of ten wrenches with a size range of ⅞ to 1½ in. Three different length handles, which fit two or more sizes of wrenches, are all that are needed to operate the complete series.

These wrenches have been designed for heavy nut turning especially on jobs where box type wrenches cannot be used or are too slow and inconvenient. On most applications, a wrench can be used to "run down" a nut in a hurry and only then is the tubular handle attached to give increased leverage for final tightening.

The wrenches are equipped with a spring mounted locking button which fits into a hole in



Heavy Duty Open End Wrench

the tubular handle to lock them securely together. As this button must be depressed with a nail or similar object, they cannot be separated accidentally. There is, therefore, no danger of the wrench slipping out and falling into machinery, which could cause extensive repairs, or of injuring personnel.

The heads of these wrenches are set at a 15-deg. angle to the handle, so that nuts can be turned with only a 30-deg. handle movement when space is restricted. The tubular handles can also be used with straight and offset type Boxockets that are also available.

For further information, write to *Snap-on Tools Corporation, Kenosha, Wis.*

(For Convenience Circle Index Code 0605)

NEW HELIWELD HOLDER, AIRCO H12A

A new lightweight, water-cooled Heliweld holder has been produced by Air Reduction for welding thin gauges of aluminum, stainless steel, copper base alloys, magnesium and killed steel. It is specifically designed for manual Heliwelding

(Continued on next page)

MORGAN'S

NEW | 18-A DUAL PURPOSE WOODWORKING VISE

EXCLUSIVE with Morgan Vise—a really new type of woodworking vise. The 18A combines the smooth action of the Continuous Screw vise with the speed and convenience of the Rapid Action vise. Machined to close tolerances. Jaw 4" deep, 7" wide and opens to 9". Adjustable stop in front jaw. Tubular steel handle.

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SHOP EQUIPMENT NEWS

(Continued from previous page)

in the aircraft, home appliance, and automotive industries.

Known as the Airco H12A, this new fabrication tool's insulation material is constructed of a tough plastic, to withstand the roughest treatment. The lightweight and well-balanced design of this holder permit continuous use with a minimum of operator fatigue, and its compactness makes it easy to manipulate in hard-to-get-at corners.

It is completely water-cooled for dependable and safe operation, providing the utmost protection from overheating in confined working areas.

Other features include interchangeable electrode caps — 2-, 3-, and 7-in. lengths; an assortment of ceramic nozzles designed to prevent arcshorting

New Airco H12A Heliweld Holder

in tight spots; a ruggedly constructed 12-foot long water-cooled cable assembly; four sizes of collets to accommodate .020-, .040-, 1/16-, and 3/32-in. diameter tungsten electrodes; and gas-tight sealing rings at the vital points to insure low operating costs.

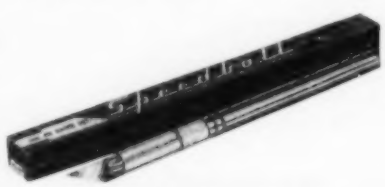
The Airco H12A holder is rated at 125 amperes and can be operated on a.c. or d.c. power. The holder measures 7½ in. in length and weighs only 4 ounces.

For further information and a copy of catalog 2300, write to *Air Reduction Sales Co., 60 East 42nd Street, New York 17, N. Y.*

(For Convenience Circle Index Code 0606)

THE SPEEDBALL NU-J KNIVES FOR ARTS AND CRAFTS

The Hunt Pen Company, manufacturers of the famous Speedball Pens and products, announce the distribution of the Nu-J Knives. These feature a new type steel chuck handle with some new design knife shapes.



Speedball Nu-J Knives

These are available in individual packets or sets, and the various knives are interchangeable in the handle. These products naturally follow

(Continued on next page)

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The black head with the red handle—exclusively Plumb
Let this hard-working partner help you do a better, faster job . . . with less effort on your part. Plumb's 100 years of experience gives you a precision-engineered hammer that works "handle-in-hand" with your own arm.
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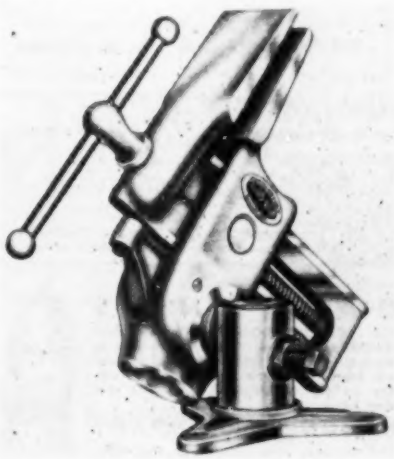
the well-known Speedball Linoleum Cutter Products.

For further information write to *C. Howard Hunt Pen Co., Camden 1, N. J.*

(For Convenience Circle Index Code 0607)

NEW COLUMBIAN VISE ADAPTER

A new Angle Adapter to permit movement of Columbian gyro-vises up and down in an arc, is announced by The Columbian Vise & Mfg. Company.



Columbian Vise Adapter

This adapter permits the vise to be placed in virtually any position required by the user. The

(Continued on page 22A)

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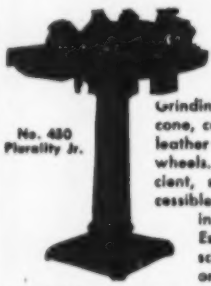

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Originators and Pioneer Manufacturers of Oilstone Tool Grinders

DESCRIPTIVE MATERIAL

(Continued from page 24A)

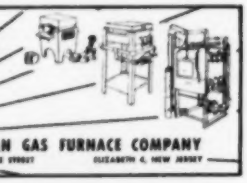
maximum flow cfh and maximum working pressure psi. The catalog is cross indexed so that a particular regulator may be located by its uses and by its gas service.

Also included are flow and pressure charts indicating at what point the regulators can be used to perform a particular job.

For complete information, write for a copy of this catalog to *Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.*

(For Convenience Circle Index Code 0614)

FURNACES for heat treating, melting, etc.



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DONJER PRODUCTS COMPANY

31-41 89th Street Woodside 77, L. I., N. Y.

INDEX TO ADVERTISERS' PRODUCTS AND SERVICES

Advertisers in this index are given a key number in addition to the page number on which the advertisement appears. Refer to the advertisement for product or services available. Write direct to advertiser or use the business reply card in requesting information from a number of advertisers.

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60	Adjustable Clamp Co.	8A
61	American Gas Furnace Co.	30A
62	American Technical Society	28A
63	Armstrong Bros. Tool Co.	13A
64	Atlas Press Company, The	5A
65	Badger-American Electrotype Co.	30A
66	Black and Decker Mfg. Co.	2A
67	Boice-Crane Company	13A
68	Brodhead-Garrett Company	23A
69	Brown & Sharpe Mfg. Co.	20A & 21A
610	Bruce Publishing Company	12A & 3rd cover
611	Challenge Machinery Co.	22A
612	Columbian Vise & Mfg. Co.	10A
613	Crafters of Pine Dunes	30A
614	Craftsman Wood Service Co.	
614	Craftsman Wood Service Co.	29A
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616	Deks, Inc.	29A
617	Delta — Rockwell Power Tool Division	11A
618	Designers Company	30A
619	Dietzgen Co., Eugene	2nd cover
620	DonJer Products	30A
621	Driscoll & Co., Martin	30A
622	Eastman Kodak Co.	15A
623	Foley Lumber Co., T. A.	30A
624	Gearon Company, The	25A
625	Giles and Kendall Co.	29A
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627	Hammett Company, J. L.	30A
628	Hardwood Corp. of America	25A
629	Indianhead Archery & Mfg. Co.	28A
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631	Johnson Gas Appliance Co.	25A
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633	Kester Solder Company	32A
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637	Millers Falls Company	16A
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656	Sta-Warm Electric Co.	30A
567	Sterling Wheelbarrow Co.	25A
658	Tenn-Acme Machine Co.	8A
659	Walker-Turner Div.	14A
660	Weber Company, F.	29A
661	Western States Envelope Co.	29A
662	Work Shop Supply and Lumber Co.	30A

SHOP EQUIPMENT NEWS

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0603	Electronic Instrument Co. — Flyback Transformer and Yoke Tester	26A
0604	Foley Mfg. Co. — Hand-Saw Retoother and Tooth Setter	26A
0605	Snap-On Tools Corp. — Heavy Duty Open End Wrenches	27A
0606	Air Reduction Sales Co. — New Airco 012A Heliweld Holder	27A
0607	C. Howard Hunt Pen Co. — Speedball Nu-J Knives	28A
0608	Columbian Vise & Mfg. Co. — Columbian Vise Adapter	29A
0609	American Aype Founders — New Ornamental Type Cuts	22A
0610	Buck Tool Co. — Buck Tool Co. 12-in. Chuck	22A
0611	Magna Engineering Corp. — New Safety Grip and Automatic Speed Control	22A
0612	Challenge Machinery Co. — New Power Operated Paper Cutter	24A
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INDUSTRIAL ARTS & VOCATIONAL EDUCATION
P.O. Box No. 2068
MILWAUKEE 1, WISCONSIN

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First Class Permit No. 1112, Sec. 34.9 P. L & R., Milwaukee 1, Wis.

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INDUSTRIAL ARTS & VOCATIONAL EDUCATION
P.O. Box No. 2068
MILWAUKEE 1, WISCONSIN

No matter how you measure it—beads, shells, or American dollars—you operate at a loss when you employ cheap faulty materials for classroom instruction. In the long run, most instructors agree, it's a lot more economical, a lot more satisfactory to use products that stand every test of time and quality. That's why so many schools insist upon Kester Solder, for more than 50 years the supreme "buy-words" in Solder.

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Kester Acid-Core Solder
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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION June, 1954
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61	67	613	619	624	629	634	639	644	649	654	659
62	68	614	620	625	630	635	640	645	650	655	660
63	69	615	621	626	631	636	641	646	651	656	661
64	610	616	622	627	632	637	642	647	652	657	662
65	611	617									

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64	610	616	622	627	632	637	642	647	652	657	662
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0602	0604										

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NEW SHOP BOOKS

To Include in your Fall Term Plans . . .

Two Titles by the Popular Writer of Shop Books, A. F. BICK:

PLASTICS FOR FUN

This complete basic course in plastics covers both acrylic and polyester casting plastics. It thoroughly discusses processing, pressing, figure carving, and working in heavy dimension material. Included also are 54 practical projects for the school shop in 50 full-page plates with sketches and full-size pattern drawings. $3.25

CONTEMPORARY FURNITURE

The author of *Artistic Metalwork* and *Furniture Design Plates* here supplies 48 large and 45 small woodworking projects that are relatively easy-to-make and help both teacher and student understand and reproduce the "new look" in furniture. Included are terrace and reading chairs, open and closed cabinets, desks and tables of various kinds with fundamental contemporary characteristics. Each project is well-illustrated and includes all necessary information. $2.75

FUNDAMENTAL WOOD TURNING

By ARCHIE S. MILTON and OTTO K. WOHLERS

A modernized edition of *A Course in Wood Turning* that thoroughly introduces beginning students to the principles of wood turning through exercises on spindle and faceplate turning. Related material on the care of the lathe, tool processes, polishing of projects, and the grinding of chisels familiarize the student with all phases of wood turning. $3.50

FURNITURE ANTIQUES FOUND IN VIRGINIA

By E. CARLYLE LYNCH

A rich sourcebook of graceful, accurately reproduced furniture pieces from Colonial Virginia. Tables, chairs, chests, highboys in Chippendale, Queen Anne, Pembroke, Windsor, American and English Empire are among the projects that require only common hand tools. Material includes construction notes, bills of material, and detailed working drawings. $3.50

WOOD AND ART METAL

By HAROLD O. AKESON

The combination of these 32 unusual wood and art metal projects offers a variety of industrial arts experience. The first ten projects in copper, brass, aluminum, and pewter with complete instructions on etching are followed by 12 in wrought iron. The last 10 projects are a combination of wood and metal to develop students' general shop skill. 85 cents

SINGLE STROKE DRAFTING LETTERING

By A. K. RIGAST

24 practical lessons on single stroke lettering with information and assignments on inclined capital and lower case letters, free-hand pen and ink drafting and vertical lettering. Includes abundant provision for exercise plus a hand lettering scale. 64 cents

CRAFTWORK IN METAL, WOOD, LEATHER, PLASTICS

By FRANKLIN H. GOTTSHALL

Here are 39 new, distinctive projects that cleverly utilize two or more materials in single projects. This new project book is fully described on page 12A of this magazine. $4.00

101 ALPHABETS

By W. BEN HUNT and ED. C. HUNT

An enlarged edition of the authors' standard reference, *Sixty Alphabets*. Contains more than 100 alphabets that range from the basic Roman alphabets to versatile modern and novelty styles developed by the Hunt brothers. $3.75

And for Professional Guidance . . .

THE SUPERVISION OF INDUSTRIAL ARTS

By WILLIAM A. BAKAMIS

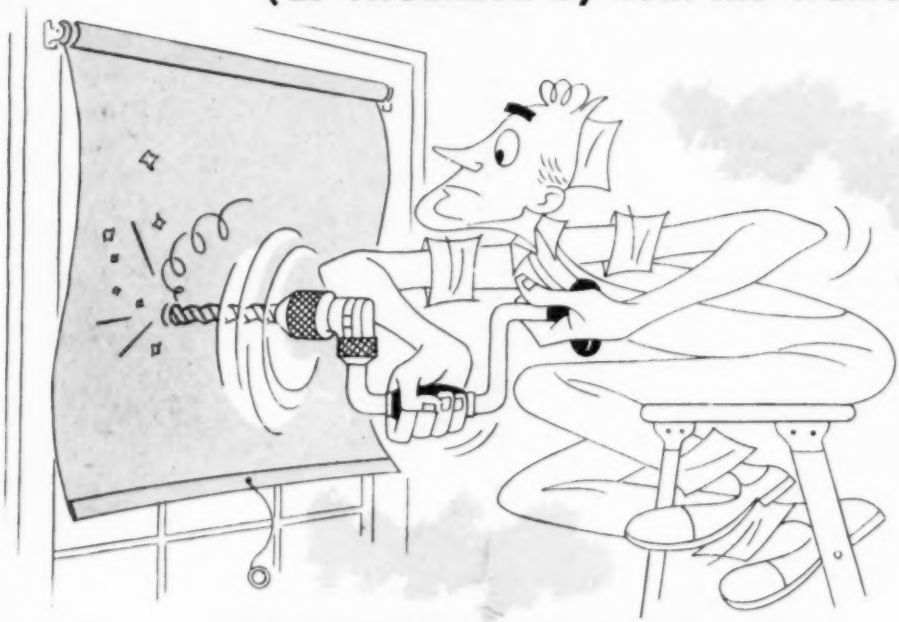
Designed to be used as reference "in-service" reading by teachers and supervisors and as a basal text for classes in school-shop supervision. It reflects sound concepts of education and a practical, modern approach to supervisory problems. $3.00

Examination copies sent without obligation for 30 days' study!

THE BRUCE PUBLISHING COMPANY • 706 BRUCE BUILDING • Milwaukee 1, Wis.

Turning Terminology

(as visualized by Tom the Trainee)



"BORING A BLIND HOLE"

Nothing "boring" about Tom's imagination! But he won't have to dream up ways to perform big-lathe operations on LeBlond Regals. Low-cost Regals have many big-lathe features, are *used in industry* on many different kinds of precision production work. They're ideal for training, easy to maintain. They'll help you prepare Tom thoroughly for his future job in the "big time." Check these Big-Lathe features:

Geared headstock — Power is transmitted efficiently at eight conveniently selected speeds.

Quick-change box — 56 feeds and threads can be chosen simply through this foolproof mechanism.

Leadscrew and feed rod — *Both* are provided to give you accurate thread-chasing, dependable feeds. Feed rod has safety clutch to automatically disengage feed when overloaded. Feed automatically engages when load is eliminated.

American Standard taper spindle nose — For safe, rugged, accurate positioning of chucks and faceplates.

One-piece apron — Long-life sturdiness and protection from dirt are built into the double-wall apron.

LeBlond Regal Lathes are available in 13″, 15″, 17″, 19″, 21″ and 24″ sizes and in a 13″ bench model. Also plain and sliding bed gap models. Write today for the complete story on these ideal training lathes.

THE R. K. LeBLOND MACHINE TOOL CO.
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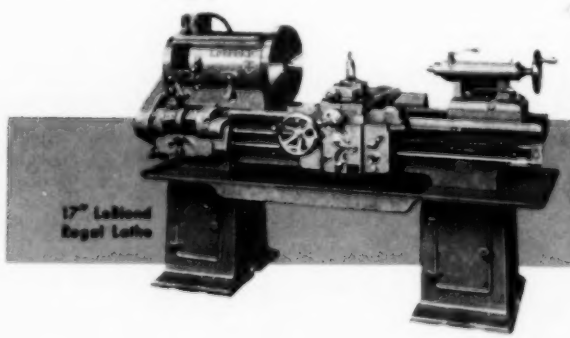

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